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Twenty-Fifth Annual Report

OF THE

State Board of Health

OF THE

STATE OF OHIO

FOR THE

YEAR ENDING DECEMBER 31, 1910.



COLUMBUS, O.:
THE F. J. HEER PRINTING CO.
1911

LETTER OF TRANSMITTAL.

OHIO STATE BOARD OF HEALTH.

OFFICE OF THE SECRETARY.

COLUMBUS, OHIO, June 10th, 1911.

To His Excellency, Judson Harmon, Governor of Ohio:

SIR:--In accordance with Section 1248 of the General Code, the accompanying report, which is for the calendar year 1910, is herewith submitted:

Respectfully,
C. O. PROBST,
Secretary.

MEMBERS OF THE OHIO STATE BOARD OF HEALTH.

*J. C. CROSSLAND, M. D., President, Zanesville.....	December, 1910
WM. T. MILLER, M. D., Vice-President, Cleveland....	December, 1911
FRANK WARNER, M. D., Columbus.....	December, 1912
†W. C. CHAPMAN, M. D., Toledo.....	December, 1913
JOSIAH HARTZELL, Ph. D., Canton.....	December, 1914
‡DARWIN G. PALMER, M. D., Geneva.....	December, 1915
JOHN W. HILL, C. E., Cincinnati.....	December, 1916
C. O. PRORST, M. D., Secretary.	

* February 20th, 1911, Dr. H. T. Sutton of Zanesville, was appointed to succeed Dr. Crossland.

† February 20th, 1911, Dr. Oscar Hasencamp of Toledo, was appointed for the unexpired term of Dr. Chapman, who died May 29th, 1910.

‡ February 20th, 1911, Dr. R. H. Grube was appointed for the unexpired term of Dr. Palmer, who died August 27th, 1910.

GENERAL REPORT.

This is the twenty-fifth annual report of the State Board of Health and is for the year ending December 31st, 1910.

It may prove interesting to briefly review the work of the Board during the past quarter of a century, and to contrast health conditions then and now. Twenty-five years ago the people generally paid but little attention to health questions. They were afraid of smallpox, yellow fever and cholera, and to a less extent of diphtheria and scarlet fever, and asked protection from such diseases when quarantine measures did not interfere too much with business. "Sewer gas" and things and places that created bad odors, were more feared than disease germs.

The law authorized council to appoint boards of health with authority to enforce quarantine measures for the prevention of dangerous diseases, and to abate nuisances, but in only a few cities and villages, about 45 or 50, had this been done. No one had authority to act in the township, except in smallpox the trustees had certain powers.

Consumption was almost universally regarded as an inherited disease, and little or no effort was made for its prevention. Even diphtheria was still considered as a non-communicable disease by many members of the medical profession, and "membranous croup" was quite generally considered as a distinct affection requiring no preventive measures.

The people in a general way knew that impure water was a cause of disease, but took scant heed of the necessity for protecting the sources from which it came. No community had undertaken to purify the water it drank, nor the sewage which it turned into the stream from which its water supply was taken.

Infected or dirty milk as a cause of disease, and especially its relation to infant mortality, was scarcely spoken of outside of medical circles. School hygiene and medical inspection of schools had no public support and few advocates.

There was practically no conception, except among the few interested in sanitary science, of the intimate relation of sociological and industrial conditions to health problems. Neither the State nor the municipality felt any special responsibility for the health of its citizens; and the conception that the public health is a valuable asset and like other property should be protected for purely economic reasons, if for no other, was entertained by few, and had had no public expression.

At the end of this quarter of a century we find great changes. Health officials with large powers and charged with weighty duties, are a

necessary part of the government of every city, village and township.

Antitoxin for the cure and prevention of diphtheria, unknown twenty-five years ago, is now, through the agency of the State Board of Health, within easy reach of every physician in the State, and is supplied free to the poor and needy.

Tuberculosis is being fought everywhere. A State Sanatorium has been provided for the cure of its victims, and many county and district hospitals have already been established, with others under way, for the care of advanced cases.

A State Society (organized in the office of the State Board of Health) and many local tuberculosis societies are engaged in combating this disease.

Ohio has become a leader in the protection of its public water supplies, and its fame in this direction has spread to most parts of the world. The State, through its State Board of Health, has entered upon a policy which will prevent further injurious contamination of its streams and lakes and must eventually free them from all sources of defilement.

Thirty-one communities, with an aggregate population of 1,007,579, are now purifying their water supplies. Thirty-five communities and 27 public institutions are purifying their sewage.

The purity of milk supplies, once unquestioned, is receiving more and more official and also public attention. Great gains have been made in school hygiene and school sanitation. Medical inspection of schools, now authorized everywhere, has been undertaken in most of our larger cities.

The most hopeful sign of advancement is the change in opinion as regards health matters. Indifference, and even, to some extent, hostility has been replaced by keen interest and a desire for help.

Twenty-five years ago a visit by a representative of the State Board of Health was often looked upon as an unwarranted interference and a reproach to the community where this was necessary. To-day the difficulty is inadequately meeting the many demands for such assistance.

Public education in health matters has been immeasurably extended. Hygiene is taught in all schools; the press and lay magazines are devoting more and more space to health subjects.

The State Board of Health has been largely instrumental in bringing about these beneficent advances, aided and supported by local health authorities. Beginning with but one employe, with its only quarters mere desk room in the office of the Attorney General, through the courtesy of that official, it has grown from year to year, adding first a laboratory, then an engineering department, until it now employs a force of twenty-nine men and women and makes use of 5,268 square feet of floor space for the conduct of its various activities.

It is only by thus contrasting conditions as they were in 1886 with

what may be seen to-day that a fair estimate can be made of our growth in power and service in protecting the public health.

Much of what has been done must be regarded as simply the foundation, soon to be buried, upon which will rest the magnificent superstructure which should, and we trust will, be erected. The future should see the sovereign state *chiefly* concerned about the health of its subjects. Every child born within its borders should receive its special care. It should be regarded as a precious asset, a valuable future citizen, able to return a hundred fold any expense necessary to insure its fullest possible development.. Wherever needed it should have a sure and helpful hand, through infancy, through school and on into the workshop and factory, with health always the chief object.

Every industry should be so regulated as to secure the best possible conditions for the protection of health. The so-called "occupational diseases" are largely preventable, and should be to that extent eradicated. The State should make a thorough study of the various conditions giving rise to such conditions as a basis for future action, legislative or otherwise, in their prevention.

Bad housing conditions are responsible for an untold but vast amount of preventable disease. This is closely associated with poverty, but not necessarily so. Life with vigorous health may be sustained under proper conditions for a comparatively small sum. The unequal division of wealth against which State and Nation is striving enforces much unnecessary poverty with its subsequent preventable sickness. Ignorance and unpreparedness to labor are possibly accountable for even more.

The instructed poor will spend their money much more wisely and effectively in protecting their health than the ignorant. The State through its schools has it in its power to do vastly more than it has yet undertaken in teaching future generations how to live cheaply and yet keep well.

The State has opened the way for better housing conditions in the creation of a Building Code Commission. A code has been formulated which the Legislature will be asked to approve. Its beneficial effects will depend upon its proper enforcement, and for this the State has ample power to provide.

Congress has had before it for some time a bill to assemble in one department a number of separate bureaus or departments that are chiefly concerned with public health questions. It would be well to consider whether this might not be advisable in our own State. A critical study of the chief function of several State offices will show, it is believed, that they could be advantageously merged into an enlarged Health Department, securing thereby both increased efficiency and economy in administration.

The next quarter of a century should bring about immense improvements in the public health. The people are just beginning to fully

realize the truthfulness of the old adage, as applied to health, that "An ounce of prevention is worth a pound of cure." They are still spending, however, thousands for cure to pennies for prevention.

Life and health are becoming more and more precious as the belief gains ground that health may be preserved and life prolonged by measures well within the power of the individual and the State. As the people become more and more convinced of this fact the State Board of Health, as the logical head of all health reform movements, should be given greatly increased powers and vastly larger appropriations.

With our increasingly complex civilization and our rapidly growing cities, we should fully recognize that for Health, upon which the State's progress so largely depends, we must expect to pay the price by providing the necessary sanitary environment for our citizens and by securing or compelling their obedience to hygienic and sanitary regulations.

A brief outline follows of the work of the Board during the year, and a detailed report of its various operations may be found farther on.

PERSONNEL.

The Board suffered a great loss in the death of Dr. William C. Chapman of Toledo, and of Dr. Darwin G. Palmer of Geneva. Dr. Chapman had served on the Board for a period of eleven years. Long before his appointment he had shown a deep interest in all matters affecting the public health, and during his official life, while health permitted, was faithful to every duty entrusted to him. Dr. Oscar Hasencamp of Toledo was appointed as his successor, for the term ending December 13th, 1913.

Dr. R. H. Grube of Xenia was appointed to fill the vacancy occasioned by the death of Dr. Palmer, for the term ending December 13th, 1915.

The term of office of Dr. J. C. Crossland of Zanesville having expired December 13th, 1910, Dr. H. T. Sutton of that city was appointed as his successor for the full term of seven years.

This was the first time in the history of the Board for such radical changes to occur, the three appointments noted above having all been made at one time.

CONTAGIOUS DISEASES.

No very serious epidemics occurred during the year. The Board was called upon forty-two times to render personal assistance to the local health authorities in the suppression of such diseases. The epidemic of mild smallpox which began in Ohio in 1898, and which has never been entirely suppressed, has continued here and there. In accordance with the custom of former years, the location and number of cases reported is given in the following table:

CASES AND DEATHS FROM SMALLPOX REPORTED TO THE STATE BOARD OF
HEALTH FROM JANUARY 1ST TO DECEMBER 31ST, 1910.

County.	Place.	Cases.	Deaths.
Adams	Liberty Township.....	1	.....
Allen	Bluffton	7	.....
	Delphos	3	.....
	German Township.....	7	.....
	Lima	39	.....
Ashland	Ashland	2	.....
Ashtabula	Ashtabula	1	.....
Athens	Athens	1	.....
Auglaize	St. Marys.....	5	.....
	Union Township.....	17	.....
	Wapakoneta	3	.....
Belmont	Bellaire	3	.....
	Pultney Township.....	5	.....
Brown	Byrd Township.....	19	.....
Butler	Hamilton	3	.....
	St. Clair Township.....	1	.....
Clark	Springfield	5	.....
Clermont	Miami Township.....	1	.....
Clinton	Green Township.....	3	.....
	Union Township.....	2	.....
	Wilmington	50	.....
	Wilson Township.....	5	.....
Columbiana	Kensington	1	.....
	Leetonia	3	.....
Crawford	Galion	2	.....
Cuyahoga	Cleveland	103	13
	Nottingham	1	.....
Darke	Greenville	3	.....
Fairfield	Hocking Township.....	2	.....
	Lancaster	4	.....
	Rushcreek Township.....	2	.....
Fayette	Madison Township.....	7	.....
Franklin	Columbus	35	.....
	Hamilton Township.....	5	.....
Gallia	Gallipolis Township.....	1	.....
Greene	New Jasper Township.....	13	.....
Hamilton	Cincinnati	10	.....
Hancock	Findlay	4	.....
Hocking	Green Township.....	1	.....
	Logan	26	.....
Jackson	Coalton	13	.....
	Jackson	23	.....
	Wellston	2	.....
Jefferson	Irondale	1	.....
Knox	Martinsburg	1	.....
Lorain	Lorain	2	.....
Lucas	Toledo	19	.....
Mahoning	Girard	1	.....
	Sebring	5	.....
Marion	Big Island Township.....	6	.....
	Marion	1	.....
	Saltrock Township.....	5	.....
Miami	Piqua	3	.....
	Tippecanoe City.....	1	.....
Montgomery	Dayton	4	.....
	Harrison Township.....	1	.....
Paulding	Paulding	2	.....

CASES AND DEATHS FROM SMALLPOX REPORTED, ETC. — Concluded.

County.	Place.	Cases.	Deaths.
Perry	Saltlick Township.....	1	.....
Pickaway	Pickaway Township.....	5	.....
Portage	Ravenna	14	.....
	Rootstown Township.....	20	.....
	Shalersville Township.....	7	.....
Richland	Jefferson Township.....	1	.....
Ross	Chillicothe	46	1
	Concord Township.....	9	.....
	Frankfort	5	.....
	Franklin Township.....	1	.....
	Kingston	1	.....
	Liberty Township.....	4	.....
	Union Township.....	12	.....
Scioto	Clay Township.....	12	.....
	Manchester Township.....	2	.....
	Portsmouth	2	.....
Seneca	Clinton Township.....	2	.....
	New Riegel.....	3	.....
	Tiffin	2	.....
Shelby	Sidney	7	.....
Stark	Alliance	45	.....
	Lexington Township.....	2	.....
Summit	Akron	3	.....
	Cuyahoga Falls.....	1	.....
Van Wert.....	Elgin	5	.....
	Liberty Township.....	1	.....
	Ridge Township.....	12	.....
	Van Wert.....	38	1
	Willshire	5	.....
	Willshire Township.....	4	.....
Wayne	West Salem.....	1	.....
	Wooster	1	.....
Williams	Montpelier	3	.....
Wood	Cygnnet	1	.....
	Lake Township.....	2	.....
Wyandot	Kirby	4	.....
Counties, 49.	Places, 92.	Total.....	779
			15

BUREAU OF CONTAGIOUS AND INFECTIOUS DISEASES.

It would be highly desirable if the Board could establish a separate department of contagious and infectious diseases. After all these are the preventable diseases which appeal for immediate remedy.

In the first place the Board should have accurate morbidity statistics concerning the prevalence of such diseases in various portions of the State. The law contemplates this, but it has been difficult of enforcement. Physicians are required to report all such cases to the local health authorities, and they in turn are required to make reports of such cases to the State Board.

During the past year an effort has been made to improve this part

of the work, under the direction of Dr. H. M. Platter. While Dr. Platter was engaged primarily to look after the inspection of Maternity Boarding Houses and Lying-in Hospitals, he has been able to give a considerable part of his time to the investigation of outbreaks of contagious and infectious diseases, and especially of typhoid fever. Reports of a number of these investigations will be found on later pages.

In addition to this a new set of blanks for reports and records was prepared, and the following communication was sent to all of the local authorities, urging them to greater effort in securing full reports from physicians, and in making proper returns to the State Board:

To Boards of Health of Cities, Villages and Townships:

Section 1243 of the General Code of Ohio provides:

"SECTION 1243. Boards of health, health authorities or officials, and physicians in localities where there are no health authorities or officials, shall report to the state board of health promptly upon the discovery thereof, the existence of any one of the following diseases: Asiatic cholera, yellow fever, smallpox, scarlet fever, diphtheria, membranous croup, typhus or typhoid fever, and such other contagious or infectious diseases as the state board specifies. (99 v. 495 Sec. 13.)

Such reports have been received with considerable regularity from most of the cities, from many villages and from some of the townships. It has never been possible, however, to have a complete report of all cases of dangerous communicable diseases occurring throughout the State.

Such information would be of great value, especially when practically complete reports of deaths from all causes are collected by the State Registrar of Vital Statistics. The State Board of Health purposes to make as complete a record as possible of all communicable diseases which by law are required to be reported.

SECTION 4427. Each physician or other person called to attend a person suffering from smallpox, cholera, plague, yellow fever, typhus fever, diphtheria, membranous croup, scarlet fever, or typhoid fever, or any other disease dangerous to the public health, or required by the state board of health to be reported, shall report to the health officer within whose jurisdiction such person is found, the name, age, sex and color of the patient, and the house and place in which such person may be found. In like manner, the owner or agent of the owner of a building in which a person resides who has any of the diseases herein named or provided against, or in which are the remains of a person having died of any such disease, and the head of the family, immediately after becoming aware of the fact, shall give notice thereof to the health officer. (R. S. Sec. 2125.)

In addition to the list of diseases above given the State Board of Health requires reports of *cerebro-spinal meningitis*, *chicken-pox*, *measles*, *whooping cough*, *infantile paralysis* and *trachoma*.

It is the duty of all local health authorities to enforce this law, a penalty for its violation being provided. The prompt report of the outbreak of a dangerous infectious disease is the first and most important step necessary for its prevention. All right minded physicians, who recognize their responsibility to

the public, cheerfully comply with this requirement, others should be compelled to do so.

It is the duty of the clerk of the board of health to keep a complete record of all such cases reported to the health officer. This is provided for in Section 4409 of the General Code which reads as follows:

"SECTION 4409. The clerk of the board shall keep a full and accurate record of proceedings of the board, together with a record of cases of contagious diseases, reported to the health officer, and at the expiration of his term of office shall turn over to his successor, books, records, papers, and other matter belonging to the board. Each board of health or the health officer where there is no board of health, shall procure suitable books, blanks, and other things necessary to the transaction of its business. Among the books to be procured and kept shall be a suitable book or books for the registration of cases of infectious or contagious diseases. (R. S. Sec. 2116.)

We are sending you a supply of a new blank which has been prepared for the use of local health authorities in reporting infectious and contagious diseases to the State Board of Health. These reports should be made out at the end of the 15th and last day of each month, and be promptly mailed. It is expected that a report shall be made twice a month, for the periods above named, whether any of the diseases mentioned are reported to the local authorities or not. Only in this way can it be made certain that reports have not been neglected or overlooked.

At the office of the State Board an entry will be made of all cases reported. Each county will be recorded separately, with a separate report of each subdivision: cities, villages and townships. Morbidity tables, showing the prevalence and location of contagious and infectious diseases in the State, will be published quarterly in the Quarterly Bulletin of the State Board of Health.

It is hoped that all local boards of health and health officers will take an interest in this work, and will endeavor to secure and send in as complete and accurate reports as possible. The first report should be made on the 16th of October, 1910, and should be for the first 15 days of that month.

Very respectfully,

C. O. PROBST, M. D., *Secretary*.

By order of the Board.

It is believed that if this work is closely followed up, as is proposed, eventually we may have fairly full and accurate records of all cases of contagious and infectious diseases occurring in the State.

This proposed department should have a sufficient number of field agents to assist the local authorities to a much better control of outbreaks of such diseases.

The blanks and reports prepared for use in this work are as follows:

INSTRUCTIONS FOR HEALTH OFFICERS.

1. Reports are to be mailed on First and Sixteenth day of each month.
2. Report cards are to be mailed whether there are cases to report or not.
3. When no case to report write "None" across face of card.
4. Cases are to be reported but once.
5. If you know of failure to report cases to you write full particulars.

Private Mailing Card

One Cent

OHIO STATE BOARD OF HEALTH,

Bureau of Contagious and Infectious Diseases,

COLUMBUS, OHIO.

SEMI-MONTHLY REPORT.

The following Contagious and Infectious Diseases
have been reported to the Board of Health of

..... Township
..... County
for Half Month Ending..... 191..

	CASES	DEATHS
Asiatic Cholera		
Bubonic Plague		
Cerebro-spinal Meningitis		
Chicken Pox		
Diphtheria		
Measles		
Membranous Croup		
Polionmyelitis (Infantile paralysis)		
Scarlet Fever		
Smallpox		
Trachoma		
Typhoid Fever		
Typhus Fever		
Whooping Cough		

Are others eruptive diseases prevailing-----

Township Clerk.

This card is in colors to distinguish the reports of cities, villages and townships.

The record card is 5 by 8 inches in size and in colors corresponds with the report card, and is printed on front and back so that one card may serve for two years.

PREVENTION OF BLINDNESS.

The Board has cordially co-operated with the special commission appointed for the prevention of blindness. Many cases of blindness are due to infection of the eyes at birth, giving rise to the disease ophthalmia neonatorum. It has long been known that the eyes could be saved in such cases by promptly using a mild solution of nitrate of silver. The Board prepared some thousands of outfits containing a solution of proper strength of this salt and sent a supply to all physicians and midwives in the State, accompanied by the following circular letter:

OHIO STATE BOARD OF HEALTH
and
OHIO COMMISSION FOR THE BLIND.

To Physicians and Midwives:

The State Board of Health, co-operating with the Commission for the Blind, has arranged for the free distribution of solutions of nitrate of silver, put up in packages convenient for ready use, for the Prevention of Blindness in the new-born.

A sample outfit is being sent to every registered physician and midwife in the state. Each outfit contains a sufficient amount of a one percent solution of the silver nitrate for use in one case, with a sterilized dropper especially adapted for making the necessary application. Explicit printed directions for applying the solution, and for other measures necessary in the treatment of ophthalmia neonatorum, accompany each outfit.

These outfits will be kept in stock at the different antitoxin and outfit stations already established by the State Board of Health of which there are from three to four in each county. They will be supplied free of cost to any physician or midwife on demand. A list of these stations is enclosed.

SPECIAL NOTICE TO MIDWIVES.

The treatment of ophthalmia neonatorum should be conducted, where possible by a physician, as it requires some skill and a knowledge of medicine. The cleansing of the eyes and the use of the silver solution may be undertaken by the midwife when the services of a physician cannot be promptly had. The further treatment of the case should be turned over to a physician.

Infection of the eyes at birth has caused the blindness of one-fourth of all the children in the schools for the blind. The nitrate of silver solution, if promptly and properly used, is an almost certain preventive.

We appeal to the Medical Profession and to all who may have the care of new-born babies, to assist in this effort to prevent this hopeless affliction.

Very respectfully,

C. O. PROBST, M. D.

Secretary, State Board of Health.

EDWARD M. VAN CLEVE,

President, Commission for the Blind.

Columbus, O., September 15, 1910.

Each of the Board's mailing outfits and antitoxin stations, of which there are three or four in each county, was also supplied with the silver solution.

DIPHTHERIA ANTITOXIN.

Diphtheria antitoxin for the cure and prevention of diphtheria has been supplied to local boards of health at low cost, as heretofore. Four thousand, six hundred and eighty-six packages were sent out during the year.

LABORATORY.

The laboratory has continued to grow in usefulness in aiding physicians to a correct diagnosis in suspected cases of contagious diseases. The total number of examinations of all character during the year reached 4,665. A detailed report of its operations and the cost of maintenance will be found on a subsequent page.

WATER AND SEWERAGE.

The engineering department has been kept actively at work investigating improvements in water supplies and sewerage. The special investigation of disposal of garbage and other municipal wastes has been completed and the report will soon be ready for publication.

Plans for new or additional water supplies for the following places have been acted upon by the Board during the year: Bradford, Cadiz, Canal Fulton, Carrollton, Coshocton, Dunkirk, Grandview Heights, Hudson, Leesburg, Lorain, Minster, Newark, Painesville, Shreve and Waverly.

Plans for sewerage for the following places were acted upon: Akron, Amherst, Andover, Bellefontaine, Conneaut (District No. 1), East Youngstown, Freeport, Hubbard, Hudson, Kenton (East Sewer Dist.), Lorain (Private), Lorain (U. S. Life Saving Station), Middletown, Minster, Piqua, Steubenville, Wilmington, Youngstown (The Realty Trust Company's Addition), Zanesville, and Zanesville (The Encaustic Tiling Company's plant).

WATER AND SEWAGE PURIFICATION.

The Board was called to pass upon plans for the purification of water at Lakeside and Port Clinton; and for the purification of sewage at Amherst, Andover, Bellefontaine, Canton (improvements), The Greene County Infirmary, Hubbard, Hudson, Jackson, Sebring, Warrensville (Correction Square and the Cleveland Colony Farm), Wilmington, Youngstown (The Realty Trust Company's Addition), and Zanesville (The Encaustic Tiling Company's plant).

CONFERENCES WITH LOCAL BOARDS OF HEALTH.

Three conferences with local boards of health were held during the year. One at Columbus in January with boards of health of cities and villages of over 3,000 population; one in Cleveland in June with township boards of health and villages of less than 3,000 in northern Ohio, and one in Cincinnati in October for boards of health of the same class in southern Ohio. These meetings were well attended. Papers were read and the discussions were printed and distributed to boards of health throughout the State.

MEETINGS OF THE BOARD.

Eight meetings were held during the year as follows:

January 19th and 20th, in Columbus.

February 16th, in Columbus.

April 20th, in Cincinnati.

June 29th and 30th, in Cleveland.

July 27th, in Sandusky.

October 19th and 20th, in Cincinnati.

December 7th, in Cleveland, and

December 28th, in Columbus.

MINUTES OF THE SECRETARY

RESUMÉ OF SECRETARY'S REPORTS.

JANUARY MEETING

1910

A regular meeting of the State Board of Health was held at the office of the Secretary, at 8 P. M., January 19th, 1910.

There were present Drs. Crossland, Warner and Mr. Hill.

Mr. C. W. Golden, mayor, and Dr. Lester Keller, member of the board of health, of Ironton, appeared before the Board and urged that some action be taken to require the Ironton authorities to furnish a pure and satisfactory water supply to said city.

The matter was referred to executive session.

The following representatives of Fostoria were then heard: Chas. L. Guernsey, city solicitor; E. C. Lease, director of public service; E. A. Warner, president of council; J. H. Furining and D. A. Lynch, private citizens.

It was stated by the city solicitor and other representatives of Fostoria present, that they had recently come into office and were not to blame for conditions complained of, nor thoroughly familiar with what proceedings had gone before. They made positive promises to the Board that, without unnecessary delay, they would make the necessary changes and improvements in their sewage purification plant, required by the State Board of Health as means for removing the nuisance complained of.

The matter was referred to executive session.

The Board then adjourned to 9:30 A. M. of the following day.

SECOND SESSION.

THURSDAY, JANUARY 20TH, 1910.

The Board reassembled at 9:20 A. M., January 20th, 1910, with Messrs. Crossland, Warner, Miller and Hill present.

The minutes of the October meeting were read and, on motion of Dr. Miller, approved.

The Board took up for consideration the complaint against the sewage disposal plant at Fostoria.

It was moved by Dr. Miller and seconded by Dr. Warner that, in view of the promises made by the present city administration to carry out the requirements of this Board as regards improving the condition and operation of the plant, no further action under the Bense Act be taken at this time, it being understood that the present administration will within sixty days' time submit detailed drawings showing proposed method of reconstructing the existing sewage purification plant, said

plans to be approved by the State Board of Health before being carried out, and that as soon as said plans have been approved the work of reconstructing the plant be prosecuted as rapidly as conditions will permit.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Warner, Miller and Hill.

Nays, none.

The Board took up for consideration the complaint against the water supply of the city of Akron.

The following representatives from Akron were given a hearing: N. M. Greenberger, city solicitor; Jonathan Taylor, assistant solicitor; N. O. Mather, state senator; H. E. Andress and W. E. Young, attorneys for the water company; W. G. Smith, Detroit, Mich.; R. A. Myers, member of the chamber of commerce; Dr. Edwin Lodge, Detroit, Mich.; George C. Jackson, member of council; J. D. Thomas, member of board of health; Charles C. Benner, director of public safety; Wm. T. Sawyer, mayor; L. M. Latta, general manager of the Akron Water Works Company, and Edward W. Bemis, deputy commissioner of water supply, New York City.

At this hearing no evidence was presented, or statement made to controvert the findings of the Board that at times the water supply of Akron is subject to more or less dangerous pollution. It was developed, however, that the city of Akron had brought suit against The Akron Water Works Company to require said company to furnish the city with pure water, and that this suit would be heard in the Supreme Court on March 2nd, 1910.

Thereupon, it was moved by Dr. Warner and seconded by Mr. Hill that the improvements or changes recommended in the report of the Board's committee are necessary and should be made, but, in view of the fact of the pending suit, which might enable the city of Akron to secure a pure and suitable water supply without action by the State Board of Health, further proceedings in this case be suspended pending the outcome of said suit.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Warner, Miller and Hill.

Nays, none.

The Board then took up for consideration the complaint that the water furnished by the Ironton water works is a menace to life and health and unfit for use by the citizens of Ironton; and having before it the report of its acting chief engineer, who investigated such conditions, the same was by motion of Dr. Warner and seconded by Mr. Hill ordered read. The report was then read.

It was then moved by Dr. Warner and seconded by Mr. Hill that the Board does find, from the report of its engineer and other evidence that the well system of Ironton is not capable of meeting the demands of the city; that the Ohio River water in raw state is not fit for domestic con-

sumption, and that the extension of the well system is not feasible because of the unsuitability of the material of which the gravel bar from which the water is obtained is composed.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Warner, Miller and Hill.

Nays, none.

Thereupon, it was moved by Dr. Warner and seconded by Mr. Hill that the secretary of the Board be instructed to notify the authorities of Ironton of the above findings made by said Board and that Wednesday evening, the sixteenth day of February, at the office of the Secretary in Columbus, at 7:30 o'clock, has been fixed as the time and place when and where the officials of the city of Ironton may have an opportunity to be heard and show cause, if any, why the city of Ironton should not be required to have in service before June 1st, 1911, a public water supply obtained in either of the following ways:

1st. By purification of water from the Ohio River in a purification plant of design and construction to be first approved by the State Board of Health; or,

2nd. By the introduction of a new supply, also to be first approved by the State Board of Health.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Warner, Miller and Hill.

Nays, none.

Mr. Frank E. Holtcamp, village clerk, and Mr. J. F. Cole, contractor, appeared before the Board and urged approval of a proposed water supply for the village of Elmore, to be derived from a well near the center of the village and located at the corner of Clinton and Cheap-side streets on property formerly occupied by the "old grist mill."

It was moved by Mr. Hill and seconded by Dr. Miller that this proposed supply be approved on the following conditions:

1st. That any well in the village not in use be filled with fine concrete to the surface as soon as such well is abandoned;

2nd. That all houses in the village be connected with the sewer system where a sewer is accessible; and,

3rd. That this approval be considered void unless the water works plant shall have been placed in operation on or before September 1st, 1910.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Warner, Miller and Hill.

Nays, none.

Mr. Thomas B. Webb, sanitary policeman of Warren, appeared before the Board and stated that he had been instructed by the mayor and council of Warren to ask the Board for an extension of time for the installation of their sewage disposal plant. The grounds for this demand were that the city expected, in the near future, to vote upon the ques-

tion of purchasing the water works, now owned by a private company, and that the city was financially unable to purchase said water works and at the same time construct a sewage disposal plant. He, therefore, asked that the time for the installation of the sewage disposal plant be extended to three years from date.

It was moved by Dr. Warner and seconded by Mr. Hill that as the purification works were not to be constructed prior to June 1st, 1911, the request be not granted.

Those voting in the affirmative were Messrs. Crossland, Warner, Miller and Hill. Negative, none.

The Secretary stated that on January 5th, 1910, notice was sent to the Van Camp Packing Company at Bryan that they would be given an opportunity at the meeting of the Board on January 19th, 1910, to be heard and to show cause, if any, why they should not install a plant to purify their wastes by October 1st, 1910, but nothing had been heard from the said company.

A report of the acting chief engineer, relative to an extension of time for the completion of the Alliance sewage purification plant, was presented. It was set forth in the report that the Board had ordered the city of Alliance to purify its sewage in a manner satisfactory to the State Board of Health by December 1st, 1909; that the Board had recommended to the local authorities that certain experiments in filtration of the sewage be carried out in advance of the installation of the plant, and that developments had shown that it would not be possible to complete these experiments before May 1st, 1910.

Thereupon, it was moved by Mr. Hill and seconded by Dr. Miller that the time within which the city of Alliance shall be required to install sewage purification works be extended to September 1st, 1910.

The roll call for the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Warner, Miller and Hill.

Nays, none.

A report by the acting chief engineer on a proposed water supply for the village of Minster was presented: said supply to be obtained from wells to be located on the site shown on the map submitted January 15th, 1910, by Mr. Samuel S. Wyer, civil engineer and contractor for the village.

It was moved by Mr. Hill and seconded by Dr. Miller that this site be approved subject to the following conditions:

1st. That sufficient land be owned or controlled by the village to prevent the location, within 300 feet of any public supply well of any building or habitation other than those necessary for water works purposes;

2nd. That before any well is placed in service a pumping test be conducted in the presence of a representative of the State Board of Health for the purpose of giving an indication of the yield of the well

and to permit of the collection of representative samples; this approval to be contingent both upon a satisfactory yield and upon a satisfactory quality of water;

3rd. That full detailed plans and specifications for the development of the supply be submitted within sixty days following the definite selection of the source of supply; and,

4th. That the conditions of this approval be considered void unless the before mentioned pumping test shall be conducted by July 1st, 1910.

Those voting in the affirmative were Messrs. Crossland, Warner, Miller and Hill.

In the negative, none.

A report by the acting chief engineer on a proposed new site for sewage purification works for New Philadelphia was presented, this site being located a short distance to the westward of the site originally proposed, as shown on sketch-map submitted January 17th, 1910, by Mr. J. F. Kuhns, city solicitor.

It was moved by Dr. Warner and seconded by Dr. Miller that this new site be approved subject to the following conditions:

1st. That the filter beds be placed at as high an elevation as is shown on the plans prepared by Paul R. Murray and E. G. Bradbury, already approved by the State Board of Health;

2nd. That the purification plant be surrounded by suitable and substantial levees which will effectively insure the safety of the works against the destructive action of floods; and,

3rd. That the plant be placed in service on or before January 1st, 1911.

Those voting in the affirmative were Messrs. Crossland, Warner, Miller and Hill.

In the negative, none.

A report by the acting chief engineer on the public water supply of Wilmington was presented.

It was moved by Mr. Hill and seconded by Dr. Warner that the Secretary be instructed to notify the Wilmington Water and Light Company that said company will be expected to furnish to the State Board of Health within ninety days time plans showing the location and source of a new supply which will be subject to the approval of the State Board of Health.

Those voting in the affirmative were Messrs. Crossland, Warner, Miller and Hill.

In the negative, none.

The Secretary presented the application of The Catherine Booth Home for Girls for a license to conduct a maternity boarding house and lying-in hospital at the northeast corner of Gilbert Avenue and Windsor Street, Cincinnati, Ohio.

It was moved by Dr. Warner and seconded by Mr. Hill that the Board grant this license.

Those voting in the affirmative were Messrs. Crossland, Warner, Miller and Hill.

In the negative, none.

The Secretary presented his quarterly report, which was approved and ordered filed.

Matters acted upon by mail were then taken up for confirmation as follows:

It was moved by Dr. Warner and seconded by Dr. Miller to confirm the Board's action of December 3rd, 1909, granting a license to Mrs. Anna L. McNairy to conduct a maternity boarding house and lying-in hospital at 322 West Fourth Street, Cincinnati.

Those voting in the affirmative were Messrs. Crossland, Warner, Miller and Hill. In the negative, none.

It was moved by Dr. Miller and seconded by Dr. Warner to confirm the Board's action of December 23rd, 1909, granting a license to Mrs. Elizabeth Steinhauer to conduct a maternity boarding house and lying-in hospital at 2083 West Twenty-sixth Street, Cleveland.

Those voting in the affirmative were Messrs. Crossland, Warner, Miller and Hill. In the negative, none.

It was moved by Dr. Miller and seconded by Dr. Warner to confirm the Board's action disapproving, November 3rd, 1909, an order adopted by the health officer of Sabina, relative to the burning of leaves.

Those voting in the affirmative were Messrs. Warner, Crossland, Miller and Hill. In the negative, none.

It was moved by Dr. Warner and seconded by Mr. Hill to confirm the Board's action of December 6th, 1909, approving plans for the Franklin County Tuberculosis Hospital, to be located on the Infirmary grounds.

Those voting in the affirmative were Messrs. Crossland, Warner, Miller and Hill. In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Miller to confirm the actions of the Board approving the health officers appointed by their respective councils to serve in lieu of a board of health since the last meeting.

It was voted to hold a special meeting of the Board on February 16th.

There being no further business, the Board adjourned.

Attest: C. O. PROBST, *Secretary*.

FEBRUARY MEETING

1910

A special meeting of the State Board of Health was held at the office of the Secretary on Wednesday evening, February 16th, 1910, at 7:30 o'clock.

Those present were Drs. Crossland, Miller, Warner and Mr. Hill.

The Secretary announced that a delegation, representing various authorities and private citizens of Ironton, was present in accordance with a citation notifying them of a hearing at this time when an opportunity would be afforded them to show cause, if any, why the city of Ironton should not be required under the Bense Act to make certain changes and improvements in the public water supply, which had been determined necessary by the State Board of Health.

The following gentlemen from Ironton were present: C. W. Bick, president; D. J. James, member, and H. M. Paul, clerk of the city council; Dr. W. E. Pricer; O. E. Irish, city solicitor; Dr. A. Clark Lowry, representative; H. H. Campbell, ex-member of council; C. H. Ketter, ex-member of board of public service; J. H. Lucas, member of board of trade; Mayor C. W. Golden, and Dr. Lester Keller, member of board of health.

After giving all present an opportunity to be heard, it was moved by Dr. Warner that the council, the mayor, the director of public service, the board of health and city solicitor of Ironton be requested to hold a conference to formulate some plan of improving the water supply, to be submitted later to the State Board of Health.

This motion was not seconded.

It was agreed, however, on the part of those present from Ironton that such a conference would be called.

On motion of Dr. Miller, seconded by Dr. Warner, further action in the Ironton case was referred to executive session.

Mr. J. C. Martin, manager of the Wilmington Water and Light Company, appeared before the Board in reference to a complaint under the Bense Act relative to the quality of the public water supply of that village. Mr. Martin gave a full explanation, as to the location of wells, the geological formation and measures previously taken by his company to develop additional supplies.

On motion of Mr. Hill it was voted to refer this matter to Mr. Hansen, Acting Chief Engineer, with instructions to keep the water supply of Wilmington under frequent observation so as to detect any change in the quality of the water.

The roll call upon the adoption of this motion resulted as follows: Yeas, Drs. Crossland, Miller, and Warner, and Mr. Hill.

Nays, none.

Mr. S. C. Carns, city solicitor, and Mayor C. S. Turnbaugh, as a member of the board of health of Cambridge, appeared before the Board to report what had been done in that city for the development of a new water supply. They stated that they had put down a number of wells, endeavoring to comply with the orders of the Board but had been unsuccessful in developing a sufficient amount of water until within the past week; that they had now found a new field and put down one new well and it seemed at least possible that they would be able to find a sufficient quantity of suitable water for a public supply. They asked that the Board take no further action at this time under the Bense Act in regard to requiring the city to introduce a sewage purification plant.

It was moved by Dr. Warner and seconded by Mr. Hill that the engineer be sent to Cambridge to investigate the proposed supply, and that further proceedings under the Bense Act be suspended for the time being.

The roll call upon the adoption of this motion resulted: Yeas, Drs. Crossland, Miller, and Warner, and Mr. Hill. Nays, none.

It was moved by Dr. Warner and seconded by Dr. Miller that further action under the Bense Act in regard to the water supply of the city of Ironton be postponed until the next meeting of the Board, in April, and that the proper authorities of Ironton be notified that they would be expected to present to the Board at that time a definite plan for improving their public water supply.

The roll call upon the adoption of this motion resulted as follows: Yeas, Drs. Crossland, Miller, Warner and Mr. Hill. Nays, none.

The Secretary reported that the Senate Finance Committee had called him before the committee and had insisted that the appropriations for the Board, which had heretofore been granted in one item, should be divided under various headings including the revision of the salaries of the various employees. He stated further that he had requested that, except for the heads of the engineering and laboratory departments, a lump sum be given for all other employees of these departments so that the Board itself might fix their salaries.

Time not permitting further consideration of this subject, it was suggested by Mr. Hill that the schedule of salaries be left to the Secretary, and the Board adjourned.

Attest: C. O. PROBST, *Secretary*.

APRIL MEETING

1910

A regular meeting of the State Board of Health was held at the Sinton Hotel, Cincinnati, at 10:00 a. m., April 20th, 1910.

There were present: Dr. Crossland, Dr. Palmer, Mr. Hartzell and Mr. Hill.

Mr. R. L. Pike, village engineer, appeared before the Board with plans for a temporary change in the water supply of Willoughby, and asked that the Board grant them further time before requiring the installation of a water filtration plant.

A delegation from the village of Carthage appeared, in reference to sewerage and sewage disposal for that village. It was stated that their understanding was that the Board would permit them to construct a sewerage system and discharge sewage into Mill Creek without the installation of a purification plant at this time. They felt that it would be a great injustice to require this until some general plan had been adopted to clean up Mill Creek. Among those present were Mr. George W. Ward, Mr. Samuel W. Bell, legal counsel for the village, Mr. Clinton Cowen, village engineer, and the chairman of the council sewer committee.

These questions were referred to executive session.

Addresses were then made by the mayor of Cincinnati, Dr. Louis Schwab; Dr. Samuel C. Swartsell, member of the Ohio River Sanitary Commission; the Rev. Peter Robertson, D. D., of Cincinnati; Mr. J. W. Ellms and Mr. F. G. Pollard, in charge of the Cincinnati water filtration plant, and Mr. John W. Hill, member of the State Board of Health. Consideration was very largely given in these addresses to the question of preventing the pollution of Mill Creek, the Ohio River and the water supply of Cincinnati.

Mr. J. F. Kuhns, city solicitor of New Philadelphia, then appeared before the Board with a request that the authorities of that city be permitted to change the outlet and extend their sewer system with the privilege of omitting the construction of a sewage purification plant at the present time. He presented resolutions from the council, board of health, the board of education, the board of trade and a petition from a large number of citizens of New Philadelphia in support of this request.

Mr. John A. Knecht, superintendent of the Victor Stamping Works, appeared before the Board in response to a citation to the company to appear by representation at this meeting, and argued that the pollution of the Little Miami River complained of was slight in amount and not sufficient to require the company to install a disposal plant.

Mr. M. H. Osborn, city solicitor of Van Wert, then addressed the Board in reference to the Board's order requiring the city of Van Wert to install a sewage purification plant. He admitted that the sewage was the cause of a nuisance, which should be abated, but pleaded the great need for a new high school building and their financial inability to construct purification works at this time. He stated, however, that plans for such works had been prepared and were to be furnished at once.

Dr. Lester Keller, member of the board of health of Ironton, appeared and urged the Board to take some immediate action requiring the city of Ironton to introduce a mechanical water filtration plant.

These matters were referred to executive session.

A recess was then taken to 3 p. m.

SECOND SESSION.

WEDNESDAY, APRIL 20th, 1910.

The Board reassembled at 3 p. m. with Drs. Crossland, Palmer, Warner, Mr. Hartzell and Mr. Hill present.

The following communication from the engineer of Willoughby, who had been requested to reduce his remarks to writing, was read:

"CINCINNATI, O., April 20, 1910.

"The State Board of Health.

GENTLEMEN:—

"RE WILLOUGHBY WATER SUPPLY."

"At the request of your board I will attempt to formulate a request in regard to the above in writing that the same may be placed before you at private session.

"I will not again attempt to review the situation as it now exists in Willoughby as I believe your Honorable Board understands it sufficiently and in case you are not clear on any point I think your chief engineer has a thorough understanding of the existing situation.

"I would like however to make a few statements in regard to the matter:

"1st. Our mayor and health officer are making all possible efforts to keep the watershed up to standard and from a recent investigation made by myself I believe they are succeeding extremely well.

"2nd. In making our request we do not wish it understood that we believe these repairs will materially increase the filtering capacity of the present system but will help in some small degree and will solve the present difficulty and give us a greater supply of water.

"3rd. The improvements we propose will also enable us to back flush the system and thoroughly wash the silt from the bed of the stream immediately over the filter.

"4th. It will also give us an adequate supply of water at our emergency intake which we do not have at the present time.

"I wish to repeat that we do think this money well expended on account of our being able to use our present system to clarify the water after the mechanical filter is installed and thus lessen operating expenses.

"What we, the council, board of public affairs and people of the village of

Willoughby want is time to make the change to a mechanical filter. In plain words we would 'Like to get on our feet' before making further improvements to the extent of a mechanical filter.

"In this connection would say that we have just installed sanitary sewer, surface sewers, sub-drains, etc., electric system, and paved one entire street.

"The people feel that they have sufficient burden for a few years, and we would earnestly request a little time for this matter to right itself and in the meantime we propose to have a competent sanitary engineer make us detailed plans for the work proposed subject to the approval of your Honorable Board.

"Thank you for your consideration and courtesy in this matter on behalf of the officers and people of the village of Willoughby, I beg to remain,

Very truly yours,

RAYMOND L. PIKE.

Engineer of the village."

It was moved by Mr. Hill and seconded by Mr. Hartzell that the village of Willoughby be required to present to the Board a definite plan for satisfactorily improving their public water supply not later than the time of the Board's meeting to be held in October, 1910.

Those voting in the affirmative were Messrs. Crossland, Palmer, Hartzell, Hill and Warner. In the negative, none.

The question submitted by the delegation from Carthage then being under consideration, it was moved by Dr. Warner and seconded by Mr. Hartzell, that the request of the village for more time for the introduction of a sewage disposal plant, together with the whole problem of the policy that should be adopted by the State Board of Health in reference to the pollution of Mill Creek, be referred to Mr. Hill, as a special committee of one, to report to the Board with his recommendations at the next meeting.

Those voting in the affirmative were Messrs. Crossland, Palmer, Hartzell, Hill and Warner.

In the negative, none.

The request from New Philadelphia to postpone the introduction of a sewage purification plant was then taken up.

It was moved by Dr. Warner and seconded by Mr. Hartzell, that the request for the postponement in building a sewage purification plant for New Philadelphia be refused, and that the city be required to proceed with the building of this plant in accordance with the former order of the State Board of Health.

Those voting in the affirmative were Messrs. Crossland, Hartzell, Hill and Warner. (Dr. Palmer did not vote.)

In the negative, none.

The Secretary was instructed to notify the authorities of New Philadelphia that this Board is ready to investigate and take proper action in regard to the pollution of the Tuscarawas River above New Philadelphia whenever petitioned to do so under the provisions of the Bense Act.

The Board having under consideration the conditions in Symmes Township, Hamilton County, as pertaining to the pollution of the Little Miami River by the sewage and other wastes discharged into said stream by the Victor Stamping Works at Twightwee, and having before it the report of the committee heretofore appointed by this Board to investigate such conditions, the same was on motion of Dr. Palmer, seconded by Mr. Hartzell, ordered read. The report was then read.

It was then moved by Mr. Hartzell, and seconded by Mr. Hill, that the Board does find, from the report of its committee and other evidence, that the Little Miami River at Twightwee is polluted by the sewage and other wastes from the Victor Stamping Works, and that the conditions thereby created are detrimental to the comfort of persons living in Symmes Township, Hamilton County, in the vicinity of said stream; and the Victor Stamping Company having been notified of the complaint heretofore filed with this Board and of its findings made after investigation thereof, appeared before the Board and was represented by Mr. John A. Knecht, superintendent of said works. An opportunity was then given to said Victor Stamping Company, through and by its officer, Mr. Knecht, to be heard regarding the complaint, and who argued that the pollution complained of was slight in amount and not sufficient to require the introduction of a disposal plant.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Palmer, Hartzell, Hill and Warner. Nays, none.

After such hearing it was moved by Mr. Hartzell and seconded by Mr. Hill that it is hereby declared that a nuisance exists that should be abated and that the Secretary be instructed to notify the Victor Stamping Company that the Board will expect said company to submit plans for the abatement of the nuisance to the State Board of Health before the next meeting of said Board, which will be held at the Hollenden Hotel, Cleveland, on Wednesday, June 29th, 1910.

The roll call for the yeas and nays upon the adoption of this motion resulted in yeas, Messrs. Crossland, Palmer, Hartzell, Hill and Warner. Nays, none.

The Board took up for consideration the question of requiring the city of Van Wert to install a sewage purification plant.

It was moved by Mr. Hartzell and second by Mr. Hill that the Secretary be instructed to ask the Attorney General to proceed against the city of Van Wert in the enforcement of the Board's order heretofore made under the Bense Act for the introduction of a sewage purification plant for the abatement of a nuisance complained of and admitted.

Those voting in the affirmative were Messrs. Crossland, Palmer, Hartzell, Hill and Warner.

In the negative, none.

The Board took up for consideration the question of improving the public water supply of the city of Ironton, and the following communication from the city clerk relating thereto was read.

"IRONTON, OHIO, April 16, 1910.

DR. C. O. PROBST, *Sec. State Board of Health, Columbus, Ohio.*

DEAR SIR:—I am directed by the council of the city of Ironton, Ohio, to inform you that this body, at a meeting held Friday evening, April 15th, 1910, acting upon the suggestion of the State Board of Health at the conference held in Columbus some weeks ago, heard the reading of bids for the investigation of the water supply system of Ironton, and after the adoption of a resolution appropriating \$600 to defray the expenses of proposed investigation, recommended to the director of public service that either the bid of L. E. Chapin of Pittsburg or Philip Burgess of Columbus be accepted and contract for the work entered into in accordance with the provisions of a resolution, copy of which is hereto attached. It is the intention of the city to make a thorough investigation into water conditions just as soon as contract can be made and river conditions will permit.

"Trusting that your honorable body will appreciate the fact that the city authorities are using their most diligent and conscientious efforts to solve the water problem in a manner acceptable to the citizens and to the approval of your honorable body, and that your action in the matter of the proposed condemnation of the water supply of Ironton may be based upon these evidences of good faith, I am,

Very respectfully,

(Signed) H. M. PAUL, *Clerk.*"

It was then moved by Dr. Warner and seconded by Mr. Hill to extend the time for presenting definite plans for making necessary improvements in the public water supply of Ironton to the time of the next meeting of the State Board of Health, June 29th, 1910, and that the city authorities be required to instruct their consulting engineers to investigate all practical means of obtaining a satisfactory water supply and furnish a copy of their findings to the Board at that time.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Palmer, Hartzell, Hill and Warner. Nays, none.

The minutes of the meeting held January 19th and 20th, 1910, were then read and, on motion of Mr. Hill, approved.

The minutes of the special meeting held February 16th, 1910, were read and on motion approved.

The Secretary presented his Quarterly Report which, on motion of Mr. Hill, was approved for publication.

The Secretary stated that the law creating the Commission for the Blind provides that it shall co-operate with the State Board of Health for the prevention of blindness; that in pursuance with this he had held several conferences with Mr. Edw. M. VanCleve, the president of the commission, in reference to supplying physicians with a silver salt solution and the seeking of their co-operation for the prevention of ophthal-

mia neonatorum; that the commission is ready to bear the cost of circularizing the medical profession providing the Board would furnish the silver solution in proper outfits.

Estimates of cost of such outfits were presented, showing that this could be furnished in large quantities for about 2 $\frac{1}{4}$ cents each. The Secretary recommended that outfits be sent to all the physicians in the State with appropriate literature and that each of the laboratory outfit stations in the State be furnished with a supply to be given to physicians free, on demand.

After some discussion, on motion of Dr. Warner, seconded by Dr. Crossland, the Board voted to co-operate with the Commission for the Blind to this end, and the Secretary was instructed to make the necessary arrangements.

The Secretary reported that the Supreme Court's decision in the Akron case had been against the city.

No action was taken in the matter by the Board.

The Board then took up for consideration the complaint of the board of health of Bellaire, charging that the public water supply of the city of Bellaire, Belmont County, Ohio, is impure and dangerous to the health of the consumers of said supply, and having before it the report of the committee heretofore appointed by this Board to investigate this complaint, the same was on motion of Dr. Warner and seconded by Mr. Hill ordered read. The report was then read.

It was then moved by Dr. Warner and seconded by Mr. Hill that the Board does find from the report of its committee, and other evidence, that the public water supply of Bellaire, Belmont County, Ohio, is constantly subject to dangerous contamination and is unfit without purification for domestic purposes.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Palmer, Hartzell, Hill and Warner. Nays, none.

Thereupon it was moved by Dr. Warner and seconded by Mr. Hill that the Secretary of this Board notify the city of Bellaire of the Board's findings and that the Board has fixed Wednesday, the 29th day of June, at the Hollenden Hotel, Cleveland, at 2 p. m. as the time and place, when and where, the city of Bellaire by its officers or others may have an opportunity to be heard, and to show cause, if any, why said city of Bellaire should not be required to engage the services of a competent consulting engineer with instructions to make such installations, repairs and changes as are necessary to place the water purification works in readiness for use on or before January 1st, 1911.

The roll call for yeas and nays upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Palmer, Hartzell, Hill and Warner. Nays, none.

The Secretary stated that notice had been sent to the authorities of the village of Bryan, and the Van Camp Packing Company, that opportunity would be given them at this meeting, to be heard in reference to the complaint that the sewage of the village and from the plant of said company is polluting certain streams and ditches in Pulaski Township, Williams County, if they so desired, but they had not appeared.

No action was taken in this matter.

The Board then took up for consideration the complaint of the trustees of Jackson Township, Darke County, charging that the plant of J. A. Long & Company is discharging sewage and other wastes into Corporation Pierce and Gray Branch ditches, and thereby creating conditions detrimental to the health and comfort of the citizens of Jackson Township, Darke County, who reside in the vicinity of said ditches, and having before it the report of the acting chief engineer of the Board, who investigated the conditions complained of, the same was, on motion of Dr. Warner and seconded by Mr. Hartzell, ordered read. The report was then read.

It was then moved by Dr. Warner and seconded by Mr. Hartzell that the Board does find, from the report of its acting chief engineer, and other evidence, that a nuisance is created which is detrimental to the comfort of the people living in the vicinity of these ditches.

The roll call upon the adoption of this motion resulted: Yeas, Messrs. Crossland, Palmer, Hartzell, Hill and Warner. Nays, none.

Thereupon it was moved by Dr. Warner and seconded by Mr. Hartzell that the Secretary of this Board notify J. A. Long & Company of the findings made by this Board and that the Board has fixed Wednesday, the 29th of June, 1910, at 2 p. m. at the Hollenden Hotel, Cleveland, as the time and place when and where the said company by its officers or others may have an opportunity to be heard and to show cause, if any, why an order should not be issued requiring said company to take proper measures to abate the nuisance complained of, by purifying the waste substances from its plant, or otherwise, not later than January 1st, 1911, or the removal of the plant to some other location where its business may be conducted without public offense.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Palmer, Hartzell, Hill and Warner. Nays, none.

The Board then took up for consideration the complaint of the board of health of East Liverpool, charging that the public water supply without purification is a menace and detrimental to public health, and having before it the report of the committee heretofore appointed to investigate the alleged pollution of this water supply, the same was on motion of Mr. Hartzell and seconded by Mr. Hill, ordered read. The report was then read.

It was then moved by Dr. Warner and seconded by Mr. Hill that

the Board does find, from the report of its committee, and other evidence, that the present public water supply of East Liverpool is dangerously contaminated and a menace to public health.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Palmer, Hartzell, Hill and Warner. Nays, none.

Thereupon it was moved by Dr. Warner and seconded by Mr. Hill that the report and recommendations of the committee of this Board be approved and adopted, and that the Secretary of the Board send a copy of the report to the mayor and council of East Liverpool.

The roll call upon the adoption of this motion was as follows: Yeas, Messrs. Crossland, Palmer, Hartzell, Hill and Warner. Nays, none.

(These recommendations were: 1st. That on or before June 1st, 1910, the city of East Liverpool be required to engage the services of a competent expert or commission of experts, satisfactory to the State Board of Health, to make a thorough study of all possible projects for improving the public water supply, the results of such studies to be embodied in a full and comprehensive report; and 2nd. That the report submitted by the expert or commission of experts serve as a basis for further action by the State Board of Health.)

The Board then took up for consideration the complaint of the Board of Health of Columbus, that the sewage from Marble Cliff, a village in Franklin County, is so corrupting the Scioto River as to cause conditions that are a menace to the public water supply of the city of Columbus, and having before it the report of the committee heretofore appointed by this Board to investigate such conditions, the same was, on motion of Mr. Hartzell and seconded by Dr. Palmer, ordered read. The report was then read.

It was then moved by Mr. Hartzell and seconded by Dr. Palmer that the Board does find from the report of its committee and other evidence, that the sewage now reaching the Scioto River is a menace to the quality of the public water supply of Columbus.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Palmer, Hartzell, Hill and Warner. Nays, none.

Thereupon it was moved by Mr. Hartzell and seconded by Dr. Palmer, that the Secretary of this Board notify the village of Marble Cliff of the findings made by this Board, and that the Board has fixed Wednesday, the 29th of June, 1910, at 2 p. m., at the Hollenden Hotel, Cleveland, as the time and place when and where the village of Marble Cliff by its officers, or others, may have an opportunity to be heard, and to show cause, if any, why the village should not be required to have completed and in operation on or before January 1st, 1911, a system of sanitary sewers and sewage purification works whereby all the

sewage of the village may be collected and purified in a satisfactory manner.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Palmer, Hartzell, Hill and Warner. Nays, none.

The Secretary presented a report on proposed water supply for the village of Bradford, to be derived from drilled wells located on property several hundred feet south of the south corporation line and on the west side of Miami Street.

It was moved by Mr. Hill and seconded by Mr. Hartzell that this supply be approved on the following conditions:

1st. That detailed plans for the development of the supply be submitted to and receive the approval of the State Board of Health; and

2nd. That this approval be considered void unless construction has been begun on or before November 1st, 1910.

Those voting in the affirmative were: Messrs. Crossland, Palmer, Hartzell, Hill and Warner.

In the negative, none.

The Secretary was instructed to advise the officials of Bradford that while the water is of good quality from a sanitary standpoint, the locality where these wells are located, or some other locality, should be thoroughly exploited and the question determined in advance, if possible, that a daily supply of not less than 200,000 gallons is available.

The Secretary presented an application from Mr. and Mrs. Harry J. Consadine, to conduct a maternity boarding house and lying-in hospital at 127 South Elizabeth Street, Lima, Ohio.

It was moved by Mr. Hill and seconded by Dr. Warner that this license be granted.

Those voting in the affirmative were: Messrs. Crossland, Palmer, Hartzell, Hill and Warner.

In the negative, none.

The Secretary presented a list of health officers, appointed by council, to serve in lieu of a board of health; all having been endorsed by five property holders of their respective villages.

It was moved by Dr. Warner and seconded by Mr. Hill that these health officers be approved.

Those voting in the affirmative were: Messrs. Crossland, Palmer, Hartzell, Hill and Warner.

In the negative, none.

The Secretary presented rules and regulations adopted by the health officer of Chesterville, serving in lieu of a board of health. These rules were the same as those recommended by the State Board of Health.

It was moved by Mr. Hill and seconded by Dr. Warner that these rules be approved.

Those voting in the affirmative were: Messrs. Crossland, Palmer, Hartzell, Hill and Warner.

In the negative, none.

The Secretary presented a report on sewage conditions at Milford, investigation having been made because of complaints of citizens of Cincinnati living along the Little Miami River during the summer season below this village.

It was moved by Mr. Hill and seconded by Mr. Hartzell that the report and recommendations be adopted; viz.; that the Board insists upon the fulfillment of conditions of approval already imposed (August 30th, 1907) in connection with the construction of a storm water sewer, and especially as regards preventing the introduction of all putrescible substances into said sewer.

Those voting in the affirmative were Messrs. Crossland, Palmer, Hartzell, Hill and Warner.

In the negative, none.

The Secretary was instructed to urge upon the village officials the necessity of taking steps toward the introduction of an adequate system of properly constructed sanitary sewers.

The Secretary presented plans for sewerage and sewage purification for the city of Bellefontaine.

On motion of Dr. Warner, it was voted to refer these plans to a committee consisting of one member and the acting chief engineer for investigation and report.

Matters previously acted upon by mail were taken up for confirmation as follows:

It was moved by Mr. Hill, seconded by Dr. Warner, to confirm the Board's action of February 3rd, 1910, approving plans for a tuberculosis hospital for Allen, Auglaize, Mercer, Shelby and Van Wert counties, presented by Messrs. McLaughlin & Hulsken, architects of Lima, on January 18th, 1910.

Those voting in the affirmative were: Messrs. Crossland, Palmer, Hartzell, Hill and Warner.

In the negative, none.

It was moved by Dr. Warner and seconded by Mr. Hartzell to confirm the Board's action of March 18th, 1910, approving revised plans for the county tuberculosis hospital for Lucas county, presented by Mr. David L. Stine, architect of Toledo, February 14th, 1910.

Those voting in the affirmative were: Messrs. Crossland, Palmer, Hartzell, Hill and Warner.

In the negative, none.

It was moved by Dr. Crossland and seconded by Dr. Warner to confirm the Board's action of March 4th, 1910, approving the general scheme for the installation of a sewerage system and sewage purification works for Wilmington, as shown on plans submitted February, 21st,

1910, by Mr. L. L. Compton, village engineer, subject to the following conditions:

- 1st. That before any contracts are let, full detailed plans be submitted to and receive the approval of the State Board of Health; and,
- 2nd. That this approval be considered as not in effect after January 1st, 1911.

Those voting in the affirmative were: Messrs. Crossland, Palmer, Hartzell, Hill and Warner.

In the negative, none.

It was moved by Mr. Hill and seconded by Mr. Hartzell to confirm the Board's action of March 26th, 1910, approving plans for sewage purification plant for Sebring, submitted February 23rd, 1910, by Messrs. Holl and Starrett, consulting engineers, of Canton, subject to the following conditions:

- 1st. That the sewerage system of the village be extended to collect all sewage and other putrescible liquid wastes now being produced within the corporation limits:

- 2nd. That permanent records be maintained showing the location and giving a description of all house and other connections that are made to the sewers:

- 3rd. That samples of all filtering material be submitted to and receive the approval of the engineer of the State Board of Health before such material is placed;

- 4th. That the purification plant be enlarged whenever the population tributary to the sewers shall exceed 2,000, or the sewage flow exceed an average of 200,000 gallons per day; and,

- 5th. That this approval be considered void unless contracts for the construction of the works are let on or before January 1st, 1911.

Those voting in the affirmative were: Messrs. Crossland, Palmer, Hartzell, Hill and Warner.

In the negative, none.

It was moved by Dr. Warner and seconded by Mr. Hartzell to confirm the Board's action of April 2nd, 1910, approving plans for proposed sewerage and sewage purification works for the plant of The American Encaustic Tiling Company of Zanesville, submitted February 18th, 1910, by Messrs. Waring, Chapman and Farquhar of New York City, civil engineers and contractors, subject to the following conditions:

- 1st. That samples of all filtering material be submitted to and receive the approval of the engineer of the State Board of Health before this material is placed;

- 2nd. That the capacity of the purification plant or any of its parts be increased when in the opinion of the State Board of Health such increase becomes necessary; and,

- 3rd. That this approval be considered void unless construction is begun on or before January 1st, 1911.

Those voting in the affirmative were: Messrs. Crossland, Palmer, Hartzell, Hill and Warner.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Dr. Crossland to confirm the Board's action of April 7th, 1910, granting permission to construct and discharge a sewer and drainage system at the Lorain Life-Saving Station, Ohio, into Black River, near the mouth, as requested March 19th, 1910.

Those voting in the affirmative were: Messrs. Crossland, Palmer, Hartzell, Hill and Warner.

In the negative, none.

It was moved by Dr. Crossland and seconded by Mr. Hill to confirm the Board's action March 5th, 1910, appointing J. R. Gaumer health officer of Plainfield, to serve in lieu of a board of health until 1912, at a salary of \$10.00 a year.

Those voting in the affirmative were: Messrs. Crossland, Palmer, Hartzell, Hill and Warner.

In the negative, none.

It was moved by Dr. Crossland and seconded by Mr. Hartzell to confirm the Board's action of March 17th, 1910, appointing H. H. Prince health officer of Canal Dover, to serve in lieu of a board of health, until 1911, at a salary of \$15.00 per month.

Those voting in the affirmative were: Messrs. Crossland, Palmer, Hartzell, Hill and Warner.

In the negative, none.

It was moved by Mr. Hill and seconded by Mr. Warner, to confirm the Board's action of April 2nd, 1910, appointing Dr. E. E. Burns health officer of Kirby, to serve in lieu of a board of health, until 1911, at a salary of \$5.00 a year.

Those voting in the affirmative were: Messrs. Crossland, Palmer, Hartzell, Hill and Warner.

In the negative, none.

It was moved by Dr. Warner and seconded by Mr. Hartzell to confirm the Board's actions renewing the following licenses to conduct maternity boarding houses and lying-in hospitals:

December 20th, 1909:

The Ohio Maternity Hospital, 529-533 East Liberty Street, Cincinnati, Ohio.

Home for the Friendless & Foundlings, 433 W. Court Street, Cincinnati, Ohio.

St. Joseph's Maternity Hospital & Infant Asylum, Ross Avenue and Reading Road, Cincinnati, Ohio.

Miss Ida Prickett, 639 West 6th Street, Cincinnati, Ohio.

January 27th, 1910:

Mrs. Minnie Knapp, 2438 Scranton Road, Cleveland, Ohio.

February 4th 1910:

St. Anna's Infant Asylum, 1535 Bryden Road, Columbus, O.

Mrs. James T. Black, 633 West Spring Street, Lima, O.

Mrs. Mary E. Throp, Jason Avenue, Clinton Township, Sta. B., Columbus, Ohio.

Mrs. Zella Briggaman, 591 Lehman Street, Columbus, O.

Dr. F. H. Darby, 34 West First Avenue, Columbus, O.

Mrs. Nora Foster, 43 West Oakland Avenue, Columbus, O.

Mrs. Carrie Chase Davis, 826 Washington Street, Sandusky, Ohio.

St. Ann's Infant Asylum and Maternity Hospital, 3409 Woodland Avenue, Cleveland, Ohio.

The Retreat Maternity Hospital & Foundlings' Home, 1609 Summit Street, Toledo, Ohio.

Celia P. Fyler, 964 Highland Street, Columbus, Ohio.

February 26th, 1910:

Salvation Army Maternity Hospital and Nursery, 5909 Kinsman Road, Cleveland, Ohio.

Woodhill Private Hospital, 3152 East 93rd Street, Cleveland, Ohio.

Cleveland Humane Society, 9014 Cedar Avenue, Cleveland, O.

Mrs. Amelia Eble, 4720 Ravine Road, S. W., Cleveland, O.

Mrs. Ida Dewey, 7804 Kinsman Road, Cleveland, O.

Maternity Hospital of Cleveland, 2364 East 55th Street, Cleveland, Ohio.

March 5th, 1910:

Mrs. Mary Howard, 430 Clark Street, Cincinnati, Ohio.

April 10th, 1910:

Mr. and Mrs. R. Jewell, 647 East Long Street, Columbus, O.

Those voting in the affirmative were: Messrs. Crossland, Palmer, Hartzell, Hill and Warner.

In the negative, none.

It was moved by Dr. Warner and seconded by Mr. Hartzell to confirm the Board's action of February 27th, 1910, to not grant a license to Mary J. Martin, at 630 Gordon Street, Piqua, Ohio.

Those voting in the affirmative were: Messrs. Crossland, Palmer, Hartzell, Hill and Warner.

In the negative, none.

On motion of Dr. Warner, it was voted to hold the next meeting in Cleveland in June, in connection with the meeting with local boards of health of villages and townships in northern Ohio.

Adjourned.

Attest:

C. O. PROBST, *Secretary.*

JUNE MEETING

1910

A regular meeting of the State Board of Health was held at the Hollenden Hotel, Cleveland, at 2 p. m., June 29th, 1910.

There were present: Messrs. Crossland, Warner, Hill, Hartzell and Miller.

In answer to a citation to the authorities of Bellaire to appear and show cause why the city should not be required to complete and put in operation its water purification plant, the following representatives from Bellaire were present: C. L. Belt, city solicitor; Charles Wassman, mayor; R. E. Crow, secretary of the board of control; Wm. A. Schramm, director of public service; Dr. D. W. Boone, health officer, and others.

After giving these gentlemen an opportunity to be heard a typewritten statement, signed by the city of Bellaire, per R. E. Crow, secretary of the board of control, was submitted and read by the Secretary.

No action was taken.

The Board then took up for consideration the question of a sewer outlet for Akron.

The following representatives from Akron were present: Robert A. Myers, president of council; Wm. T. Sawyer, mayor; Nicholas M. Greenberger, city solicitor; John W. Gothier, director of public service; John W. Payne, city engineer; Jonathan Taylor, assistant city solicitor; E. G. Bradbury, consulting engineer and others.

Permission was asked to discharge an outlet for a trunk sewer into Little Cuyahoga River about 2 miles below the present sewer outlets. It was stated that options had been secured and the money had been appropriated for the purchase of about 50 acres of land upon which to erect a sewage disposal plant. Mr. Bradbury, the consulting engineer, stated that they had found an unusually large flow of sewage in Akron which was probably of a very dilute character and that some experimentation would be advisable to determine the best method for its purification.

It was moved by Mr. Hill and seconded by Dr. Miller, that the outlet for the trunk sewer to discharge into Little Cuyahoga River about 2 miles below the present outlets be approved, and that the city of Akron be given six months time in which to submit to the State Board of Health some definite method for disposing of its sewage, with the understanding that if such method is approved by the Board, the city of Akron shall furnish, without delay, plans for a sewage disposal plant.

Those voting in the affirmative were: Messrs. Crossland, Warner, Hill, Hartzell and Miller.

In the negative, none.

The question of the Akron water supply was then taken up for consideration, and the officials of Akron present at the meeting urged that the Board issue an order without delay requiring The Akron Water Works Company to furnish a satisfactory supply.

It was then moved by Mr. Hill and seconded by Dr. Warner that the report of the Board's committee and recommendations therein contained be now approved and confirmed, extending the time to January 1st, 1912.

The roll call upon the adoption of this motion resulted in: Yeas, Messrs. Crossland, Warner, Hill, Hartzell and Miller. Nays, none.

It was thereupon moved by Mr. Hill and seconded by Dr. Warner that it is hereby declared to be necessary that The Akron Water Works Company shall be required to install and place in operation not later than January 1st, 1912, a water purification plant which will meet the approval of the State Board of Health, or secure a new source of supply satisfactory to said Board.

The roll call upon the adoption of this motion resulted in: Yeas, Messrs. Crossland, Warner, Hill, Hartzell and Miller. Nays, none.

Thereupon, it was moved by Mr. Hill and seconded by Dr. Warner that the report and findings of the Board be transmitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted in: Yeas, Messrs. Crossland, Warner, Hill, Hartzell and Miller. Nays, none.

The Board then took up for consideration the complaint of the village of Jeromeville, that the village of Ashland, Ashland County, Ohio, is discharging and permitting to be discharged sewage and other wastes into Jeromeville Creek, and by reason thereof is so corrupting said creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Jeromeville, who reside in the vicinity of said creek, and having before it the report of the committee heretofore appointed by this Board to investigate such conditions, it was, on motion of Dr. Miller and seconded by Mr. Hill, ordered read. The report was then read.

It was then moved by Dr. Miller and seconded by Mr. Hill that the Board finds from the report of its committee and other evidence that there exists no cause for complaint on account of the pollution of Jeromeville Creek, due to the discharge into said creek of unpurified sewage from the village of Ashland, but that there does exist in the village of Jeromeville certain unsanitary conditions, described in the committee's report, which should receive attention.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Warner, Hill, Hartzell and Miller. Nays, none.

Thereupon, it was moved by Dr. Miller and seconded by Mr. Hill that the Secretary of this Board notify the authorities of Jeromeville of the findings made by this Board, and that he send a copy of the report of

the Board's committee to the mayor and council of the village of Jeromeville, and to the mayor and council of the village of Ashland.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Warner, Hill, Hartzell and Miller. Nays, none.

The question of place of next meeting of the Board was brought up for discussion and it was voted, on motion of Dr. Warner, duly seconded, to hold the next meeting of the Board on the fourth Wednesday in July, 1910, at the West House in the city of Sandusky.

The Board then took up for consideration the complaint of the board of health of the city of Lima that the county infirmary, located in Allen County, Ohio, is discharging sewage and other wastes into the intake channel of Lima reservoir and by reason thereof has so corrupted the water of said reservoir as to be a menace to the public water supply of the city of Lima; and having before it the report of the committee heretofore appointed by the Board to investigate such conditions, it was, on motion of Mr. Hill, seconded by Dr. Miller, ordered read. The report was then read.

It was then moved by Mr. Hill and seconded by Dr. Miller that the Board finds from the report of its committee, and other evidence, that the public water supply of Lima is endangered by objectionable drainage entering the Ottawa River near the water works intake. The Board further finds that the said reservoir was built without the approval of the State Board of Health; and that the original plans were changed whereby a small stream receiving the sewage from the Allen County Infirmary was diverted so as to discharge into Ottawa River immediately below the water intake with the result that when the river is in flood eddy currents may readily carry pollution from the ditch to the intake.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Warner, Hill, Hartzell and Miller. Nays, none.

Thereupon, it was moved by Mr. Hill and seconded by Dr. Miller that the Secretary of this Board notify the authorities of the city of Lima of the Board's findings, and that the Board has fixed 8 p. m., the 27th day of July, 1910, at the West House, Sandusky, Ohio, as the time and place, when and where the authorities of Lima, by their officers or others, may have an opportunity to be heard, and to show cause, if any, why the city of Lima should not be required to provide necessary sewers, channels, or other means that will successfully convey all objectionable drainage now entering the ditch passing the Allen County Infirmary and entering the Ottawa River near the water work's intake, to a point well below the reservoir where it will not endanger the public water supply of Lima.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Warner, Hill, Hartzell and Miller. Nays, none.

The Board then took up the question of the complaint against The Victor Stamping Company at Twightwee, the said company having been

cited to appear before the Board at this meeting, and the Secretary read the following communication :

"TWIGHTWEE, OHIO, June 22, 1910.

"OHIO STATE BOARD OF HEALTH, *Columbus, Ohio.*

"GENTLEMAN :—

We have your favor of the 17th inst. We have not made any drawings relative to this matter. As we understand the discharge of water from our storage vats in our galvanizing room is the point of complaint. As we explained to your Board at your Cincinnati meeting, this discharge has no effect on the water in the river as it is so very weak; since the iron ware is pickled in a solution which is made up of one part sulphuric acid to twenty of water; the storage water is used only in the evening at the end of the day's run; the ware being immersed in the water to prevent its rusting. The ware before being placed in the storage vats, is well drained of the pickling solution, so as not to waste it, so the amount of acid that flows into the river is scarcely perceptible.

However, should your Board require that the discharge of this water into the river be discontinued, we will discharge it on our grounds, as we know it has no harmful effect on vegetation.

As to the closets in the factory, they could be connected to cesspools, as the quantity of waste from them is not large. The storm water we will continue to discharge into the river.

The installation of the purification system as outlined in your engineer's letter, would be detrimental to the health of our community; the conditions, as they now are, are good. Your engineer suggests that the sewerage plant be not nearer than 500 feet to any house, or 200 feet to any roadway; we have no ground that will meet these conditions.

We are informed that the township trustees have power to build sewage disposal plants; and we suggest that since we pay taxes that the trustees of this township are the people who should furnish this plant. As incorporated villages pay for such improvements out of their treasury, or by bond issue, so Symmes township should pay for this improvement. It is not right to expect any individuals or private corporation to do so.

We trust that you will give our letter your earnest consideration before finally deciding this matter.

Respectfully,

THE VICTOR STAMPING CO.

Per ARTHUR E. KNECHT."

Thereupon, it was moved by Mr. Hill and seconded by Dr. Miller that The Victor Stamping Company be required to submit plans to the State Board of Health on or before August 10th, 1910, for the abatement of the nuisance complained of; and that The Victor Stamping Company be further required to make such changes and improvements as regards the disposal of sewage and other wastes on or before January 1st, 1911, as will remove the nuisance complained of to the satisfaction of the State Board of Health.

The roll call upon the adoption of this motion resulted in: Yeas, Messrs. Crossland, Warner, Hill, Hartzell and Miller. Nays, none.

Thereupon, it was moved by Mr. Hill and seconded by Dr. Miller

that the report and findings of the Board be transmitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted in: Yeas, Messrs. Crossland, Warner, Hill, Hartzell and Miller. Nays, none.

The Secretary presented a communication from the director of public service of Ironton, stating that, pursuant to instructions from this Board, he had on the 14th day of May, 1910, entered into contract with the firm of Burgess, Kimberly and Long, of Columbus, Ohio, for the examination of the filter beds in the Ohio River from which the city of Ironton obtains its water supply; examination and analysis of water drawn therefrom; examination of well clusters and report on the efficiency of the wells; the advisability of increasing their number or changing their location and recommendations for the improvement of the water supply of the city, such examination to be begun as soon as the stage of water in the Ohio River will permit, carried on without unnecessary delay, and accomplished within a period of six days.

The Secretary presented a report upon proposed water supply for Cambridge, which showed that it would be impossible for that city to obtain a public water supply from ground sources.

On motion of Mr. Hill, seconded by Mr. Hartzell, it was voted to request the city of Cambridge to engage the services of a competent consulting engineer to prepare plans and specifications for storage facilities, purification works, and all necessary adjuncts involved by an improvement of the present water supply to an extent that will render it safe from a sanitary point of view and will remove all objectionable physical characteristics; these plans and specifications to be submitted to the State Board of Health not later than September 1st, 1910, and that after the plans and specifications have been duly approved by the State Board of Health, works will be installed in accordance therewith at a date not later than May 1st, 1911; and in case the city of Cambridge fails to comply with either of the above requests, that the Board proceed in compliance with the petition submitted under the Bense Act, October 10th, 1908, to require the city of Cambridge to install sewage purification works and the necessary trunk sewers leading thereto so that all of its sewage may be purified in a manner satisfactory to the State Board of Health before being discharged into Wills Creek below the city.

Those voting in the affirmative were: Messrs. Crossland, Warner, Hill, Hartzell and Miller.

In the negative, none.

The Secretary presented a report on proposed extension of the water works intake for the city of Lorain.

It was moved by Dr. Miller and seconded by Dr. Warner to approve this proposed extension as shown on plans submitted on April 29th, 1910, by William E. Knight, director of public service.

Those voting in the affirmative were: Messrs. Crossland, Warner, Hill, Hartzell and Miller.

In the negative, none.

The Secretary presented a report on proposed extension of intake for the Painesville water works.

It was moved by Dr. Warner and seconded by Mr. Hartzell that this proposed extension of the intake into Lake Erie be approved only upon the condition that at the same time contracts are let for its construction contracts shall also be let for the construction of purification works satisfactory to the State Board of Health.

Those voting in the affirmative were: Messrs. Crossland, Warner, Hill, Hartzell and Miller.

In the negative, none.

The Secretary presented a report on proposed sewerage and sewage purification for the village of Amherst.

It was moved by Mr. Hill and seconded by Mr. Hartzell to approve the plans for a system of sewerage and sewage purification works for Amherst, submitted June 6th, 1910, by Mr. L. E. Chapin, consulting engineer, subject to the following conditions:

1st. That contracts for the construction of the sewage purification works be awarded at the same time as contracts for the construction of the sewerage system;

2nd. That samples of all sand and gravel used in filter beds be submitted to the engineer of the State Board of Health before being placed;

3rd. That provision be made for maintaining an accurate and readily accessible record of the number, location and character of all service connections;

4th. That as soon as the sewerage system is placed in use there be employed by the village a competent person as superintendent of sewerage and sewage disposal; and,

5th. That this approval be void unless construction is begun on or before January 1st, 1911.

Those voting in the affirmative were: Messrs. Crossland, Warner, Hill, Hartzell and Miller.

In the negative, none.

The Secretary presented a report by the engineer upon a trunk sewer in Fourth Street, Defiance, recently constructed for the purpose of receiving sewage from existing sewers in Wayne and Jefferson streets.

It was moved by Mr. Hill and seconded by Mr. Hartzell to approve this sewer and to instruct the Secretary to notify the authorities of Defiance that the Board will not consider the approval of additional sewers until the city of Defiance has, with the assistance of a competent consulting engineer, prepared plans whereby all the sanitary sewage of the city may ultimately be conducted to a single point at a site suitable for the erection of purification works.

Those voting in the affirmative were: Messrs. Crossland, Warner, Hill, Hartzell and Miller.

In the negative, none.

Mr. Hill then moved to reconsider the vote on Defiance and refer the matter back to the engineer for further consideration.

This motion was carried.

Dr. Warner then brought up the question of subscriptions to sanitary journals which were being received by members of the Board through the Board's office. He stated that he believed it to be inexpedient for the Board to pay for sanitary journals for its members and moved that all such subscriptions should cease after the year 1910.

This motion was seconded by Mr. Hill and carried.

Dr. Warner then brought up the question of the Board's sending its employes to various National sanitary conferences. He stated that after investigation he was doubtful as to the legality of this action. He therefore moved, and it was duly seconded, that hereafter no employee of the Board other than the Secretary be sent as a representative to any National conference.

This motion was seconded and carried.

Dr. Warner then moved that the Board should hereafter hold six instead of four regular meetings each year; and that so far as possible these meetings be arranged as to date and place, as follows:

January, third Wednesday, in Columbus.

February, fourth Wednesday, in Columbus.

April, third Wednesday, in Cincinnati.

June, third Wednesday, in Cleveland.

July, fourth Wednesday, in Toledo.

October, third Wednesday, in Cincinnati.

This motion was seconded and carried.

The Secretary stated that Mr. Pratt, who had been given a year's leave of absence, would return and resume his duties the first of July. He called attention to the work which had been conducted under the direction of Mr. Hansen during the past year and a half in the special investigation of the disposal of garbage and other city wastes. He recommended that Mr. Hansen be retained to complete and put this report in shape for the printer, and that if necessary he be allowed the privilege of visiting one or two cities outside of the state where modern garbage plants have been introduced.

After some discussion, it was moved by Mr. Hill and duly seconded that Mr. Hansen be retained to finish the garbage report and that he be paid a sum, for this work, of not to exceed \$500.00, and in addition his necessary traveling expenses if it should be found necessary to visit other cities; all of which to be subject to the approval of the Attorney General.

This motion was carried.

The Secretary then called attention to the act of the legislature requiring the State Board of Health to appoint an inspector of plumbing. He submitted a list of nine applicants with accompanying recommendations, for this position.

On motion of Dr. Miller, duly seconded, it was voted to refer this appointment to a committee of three for investigation and report at the next meeting of the Board.

Mr. Hartzell presented a resolution in reference to the death of Dr. Wm. C. Chapman, of Toledo, member of the Board, which was adopted.

The Board reassembled at 10 A. M. Thursday, June 30th, 1910.

SECOND SESSION.

THURSDAY, JUNE 30TH, 1910.

Those present were: Drs. Crossland and Miller, Mr. Hill and Mr. Hartzell.

The minutes of the April meeting were read, and on motion of Mr. Hartzell, seconded by Dr. Miller, approved.

The Secretary presented his quarterly report, which, on motion, was approved and ordered filed.

The election of officers for the ensuing year was taken up.

Mr. Hill nominated Dr. Miller as president, to take his seat at the October meeting. The motion was seconded and carried.

The Secretary was instructed to cast the ballot of the Board for Dr. Miller as president. The Secretary announced that he had cast the ballot, as directed, and Dr. Miller was declared elected president.

Mr. Hill nominated Dr. Warner for vice president and moved that the Secretary be directed to cast the ballot for Dr. Warner. The motion was seconded and carried.

The Secretary announced that he had cast the ballot of the Board as directed and Dr. Warner was declared elected vice president.

Mr. Hill moved that a vote of thanks be tendered the retiring president. The motion was carried.

The report of Mr. Hill, as a special committee of one, upon the pollution of Mill Creek was presented.

On motion of Mr. Hartzell, duly seconded, this report was adopted.

On motion of Dr. Miller it was voted to continue the committee and to instruct Mr. Hill to present to the Board of Public Works the recommendation that the wastage from the canal be made use of for flushing Mill Creek.

On motion of Mr. Hill, duly seconded, the Secretary was instructed to notify the authorities of Carthage and Elmwood Place of the action of the Board in reference to Mill Creek, and that the Board would not require the installation of sewage disposal plants at this time.

The Secretary presented a report on a proposed sewer in Lorain,

with outlet into Black River immediately north of the Erie Avenue bridge, to be constructed by Mr. A. Baldwin, a private citizen.

It was moved by Dr. Miller and seconded by Mr. Hill that permission be granted Mr. Baldwin to construct said sewer.

Those voting in the affirmative were: Messrs. Crossland, Miller, Hill and Hartzell.

In the negative, none.

The Secretary presented a report on proposed sewage purification for the Greene County Infirmary.

On motion of Mr. Hartzell, seconded by Mr. Hill, the general scheme for sewage purification for the Greene County Infirmary, as set forth in the report of the consulting engineers, Messrs. Burgess, Kimberly and Long, submitted June 28th, 1910, was approved upon the following conditions:

1st. That before contracts are let, a full set of detailed plans and specifications be submitted which will meet the approval of the engineer of the State Board of Health;

2nd. That as soon as the purification plant is completed and placed in operation, the infirmary directors designate a responsible person as caretaker, who shall maintain and operate the plant in accordance with instructions from and in a manner satisfactory to the State Board of Health; and,

3rd. That this approval be considered void unless contracts are awarded on or before January 1st, 1911.

Those voting in the affirmative were: Messrs. Crossland, Miller, Hill and Hartzell.

In the negative, none.

The Secretary presented a report on proposed additional sewerage for Middletown.

It was moved by Mr. Hartzell and seconded by Mr. Hill that the plans for proposed additional sewerage for Middletown, submitted by Mr. W. E. McElree, city engineer, on May 11th, 1910, and known as the Michigan Avenue sewer, be approved subject to the following conditions:

1st. That necessary sanitary sewers be built and purification works be installed whenever in the opinion of the State Board of Health such works become necessary; and,

2nd. That this approval be void after January 1st, 1911, unless construction of the sewer is begun on or before that date.

Those voting in the affirmative were: Messrs. Crossland, Miller, Hill and Hartzell.

In the negative, none.

The Secretary presented a report on proposed storm water sewers for the village of Minster, with two outlets into the Miami and Erie Canal, located at Fifth Street and Third Street, respectively, as shown

on plans submitted May 31st, 1910, by Mr. J. E. House of Wapakoneta, consulting engineer.

From the fact that existing storm water drains have been permitted to receive domestic wastes and have created nuisances in the canal near their outlets, it was moved by Mr. Hill and seconded by Mr. Hartzell that these proposed storm water sewers be disapproved until such time as the village is able to install an adequate system of sanitary sewers that will take care of sanitary wastes; and that the Board request the authorities at Minster to submit some definite plans for a proposed system of storm water drains and sanitary sewers.

Those voting in the affirmative were: Messrs. Crossland, Miller, Hill and Hartzell.

In the negative, none.

The Secretary presented a report on proposed sewer to be constructed in the southern part of the city of Sandusky, as shown on plans submitted May 19th, 1910, by the city solicitor, Mr. George Steinemann.

Mr. Hill moved that the report be received but before taking action in the matter the Board give the authorities of Sandusky an opportunity to be heard at its meeting to be held July 27th, 1910.

This motion was seconded and carried.

The Secretary presented a report on proposed additional sewerage for Steubenville, to serve a district in the southern part of the city as shown on plans submitted June 4th, 1910, by Mr. J. N. Leech, city engineer.

It was moved by Mr. Hill and seconded by Dr. Miller that these plans be approved subject to the following conditions:

1st. That no house connections be permitted until such time as Wells Run is enclosed from point of outlet of the proposed sewer to the Ohio River;

2nd. That should purification of the sewage of the city at any time become necessary, the city will make suitable alterations and extensions whereby all the sanitary sewage from the city may be conducted to a single point at a site suitable for purification works; and,

3rd. That this approval be considered void unless contracts for construction are awarded on or before January 1st, 1911.

Those voting in the affirmative were: Messrs. Crossland, Miller, Hill and Hartzell.

In the negative, none.

The Secretary presented a report on proposed sewerage and sewage purification for The Realty Trust Company's addition to the city of Youngstown, as shown on plans submitted June 16th, 1910, by Mr. H. M. Reel, consulting engineer.

It was moved by Mr. Hartzell and seconded by Dr. Miller that these plans be approved subject to the following conditions:

1st. That as soon as the work is completed a caretaker be appointed

whose duty it shall be to visit the purification works at least once a day and maintain them in a manner satisfactory to the State Board of Health;

2nd. That an exact and readily accessible record be maintained of all house connections made to the system of sewers;

3rd. That samples of all filtering material be submitted to and receive the approval of the engineer of the State Board of Health before being placed;

4th. That the distributors for distributing the flow of sewage on to the surface of the filter beds be provided with a simple, adjustable arrangement whereby the flow at each point of outlet may be approximately equalized; and,

5th. That this approval be considered void unless construction is begun on or before January 1st, 1911.

Those voting in the affirmative were: Messrs. Crossland, Miller, Hill and Hartzell.

In the negative, none.

The Secretary was instructed to suggest to the consulting engineer that the following changes be made:

That the inlet and outlet arrangements for the sedimentation tank be redesigned so as to provide a somewhat more even inflow and outflow across the width of the tank;

That a trough open at the top be placed across each end of the tank; the bottom of the trough to extend about 18 inches or 2 feet below the flow line;

That openings from the inlet trough be placed flush with the bottom thereof and made about 6 inches in diameter. The openings for drawing off the sewage into the outlet trough may consist of weirs; and,

That while it is not distinctly shown on the plans, it should be understood that the sludge drain will lead to one of the filter beds instead of the creek direct.

The Secretary presented a report on proposed additional sewerage for the Southwestern Sewer District of Zanesville, to be constructed by M. O. Kelly and other property owners within this district.

It was moved by Mr. Hill and seconded by Mr. Hartzell that this proposed sewer, serving the territory bounded by West Main Street, Melrose Avenue, Osage Street and Young Street, be approved subject to the following conditions:

1st. That the sewer be built in full conformity with plans on file in the office of the city engineer of Zanesville, and with a view to ultimately connecting said sewers with a comprehensive system of sewers for the Southwestern Sewer District, which will have its point of discharge into the Muskingum River;

2nd. That the temporary outlet be extended well into the channel of the stream where the sewage may always be discharged into a good current of water and at an elevation below low water; and,

3rd. That this approval be considered void unless construction is begun on it before January 1st, 1911.

Those voting in the affirmative were: Messrs. Crossland, Miller, Hill and Hartzell.

In the negative, none.

The Secretary presented a request from the commissioners of Lorain County, and a map showing a proposed site for the Lorain County Tuberculosis Hospital, submitted by Mr. Charles Chandler, clerk, June 13th, 1910, said site being 10 acres of land adjoining the Lorain County Infirmary farm and formerly owned by Frankie A. Sites. This site was investigated by the Secretary, who recommended its approval.

It was moved by Dr. Miller and seconded by Mr. Hartzell that this site be approved.

Those voting in the affirmative were: Messrs. Crossland, Miller, Hill and Hartzell.

In the negative, none.

The Secretary presented a report on proposed sewage purification for Bellefontaine, as shown on plans submitted June 29th, 1910, by The Riggs and Sherman Company, consulting engineers.

It was moved by Mr. Hill and seconded by Mr. Hartzell that these plans be approved subject to the following conditions:

1st. That 2 acres of intermittent sand filters be substituted for the final treatment by broad irrigation unless it is amply demonstrated to the satisfaction of the engineer of the State Board of Health that the soil is of satisfactory character for this purpose;

2nd. That plans for all automatic controlling machinery be submitted to and receive the approval of the engineer of the State Board of Health before being installed;

3rd. That samples of all contact and filtering material be submitted to and receive the approval of the engineer of the State Board of Health before being placed;

4th. That complete plans and specifications be filed with the State Board of Health as soon as same are prepared;

5th. That as soon as the works are completed there be appointed by the city a competent person to act as superintendent of sewerage and sewage purification; and,

6th. That the sewage purification plant be completed and ready for operation before any house connections whatsoever are made with the sewerage system.

Those voting in the affirmative were: Messrs. Crossland, Miller, Hill and Hartzell.

In the negative, none.

The Board then went into executive session.

Mr. Hill stated that he had had a conversation with Dr. Warner after the meeting on the 29th, in reference to the action taken for the publica-

tion of the special garbage report, and that on Dr. Warner's suggestion he would move to reconsider the vote to employ Mr. Hansen to finish the special report on garbage, and that the matter be referred to a special committee of one for investigation, said committee to report his recommendations to the Secretary by July 5th, 1910, and a copy of this report be furnished the members of the Board for mail vote.

The motion was adopted.

The President appointed Mr. Hill the committee to make this investigation and report.

The President also named the following committee, to which was referred the applications for the position of State Plumbing Inspector, namely: Dr. Warner, Mr. Hill and Dr. Miller.

The Secretary presented a financial statement which was received and filed.

He also presented a report of work done in the laboratory.

Matters previously acted upon by mail were then taken up for confirmation as follows:

It was moved by Mr. Hartzell and seconded by Mr. Hill to confirm the Board's action of May 10th, 1910, approving the general plans for sewerage and sewage purification works for the village of Andover, prepared by Mr. L. E. Chapin, consulting engineer, and submitted by him April 7th, 1910, subject to the following conditions:

1st. That before any contracts are let there be submitted to the State Board of Health complete plans embodying certain changes of detail in the design of the purification works satisfactory to the engineer of said Board;

2nd. That a small shelter house be built at the site of the purification works for the convenience of the caretaker;

3rd. That the village maintain accurate and complete records describing and giving the location of all house connections, and that all house connections be inspected during construction by a representative of the village; and.

4th. That this approval be considered void unless contracts shall have been awarded on or before January 1st, 1912.

Those voting in the affirmative were: Messrs. Crossland, Hartzell, Hill and Miller.

In the negative, none.

It was moved by Mr. Hill and seconded by Mr. Hartzell to confirm the Board's action of May 14th, 1910, disapproving the use of the sewer constructed in the village of Freeport by Mr. B. W. Rowland of Cadiz, as a carrier of house sewage or any domestic or putrescible wastes whatsoever, and the notification of the mayor and council that no connections are to be made with said sewer unless adequate purification works are built for properly taking care of the sewage before it is discharged into Big Stillwater Creek.

Those voting in the affirmative were: Messrs. Crossland, Hartzell, Hill and Miller.

In the negative, none.

The Secretary was instructed to notify the authorities of Freeport that before any contracts are let for the construction of purification works, plans thereof should be submitted to and receive the approval of the State Board of Health; and that, in view of the existence of a public water supply in the village it would be highly desirable to arrange for the installation of an adequate system of sanitary sewers which may ultimately be extended to all parts of the village and so designed that all sewage may be conducted to a single point and there purified.

It was moved by Mr. Hartzell and seconded by Mr. Hill to confirm the Board's action of May 17th, 1910, approving Stout Spring and Sheard Spring as new sources of water supply for the village of Shreve, subject of the following conditions:

1st. That the village obtain by purchase or otherwise control over all land on the watershed within 300 feet of either spring in order that no habitations or other sources of possible contamination of the springs may be located within this area;

2nd. That before contracts are let for the development of either spring, complete detailed plans and specifications showing method of collecting the flow of the springs, protecting the waters thereof and conveying same to the village, be submitted to and receive the approval of the State Board of Health;

3rd. That the existing supply consisting of a drilled well near the corner of Robinson and Main streets, be abandoned as a source of water supply; and,

4th. That this approval be considered void unless the sources of supply herein referred to are placed in service on or before January 1st, 1912.

Those voting in the affirmative were: Messrs. Crossland, Hartzell, Hill and Miller.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Miller to confirm the Board's action approving, May 17th, 1910, plans for a system of sanitary sewers for the city of Bellefontaine, shown on drawings and described in specifications prepared by The Riggs and Sherman Company of Toledo, consulting engineers, and submitted April 2nd, 1910, subject to the following conditions:

1st. That no contracts for the construction of sewers be entered into until plans for sewage purification works have been submitted to and received the approval of the State Board of Health;

2nd. That no contracts for the construction of sewers be entered into until land suitable for the location of purification works approved by the State Board of Health, is purchased;

3rd. That the purification works shall be completed on or before January 1st, 1912.

4th. That no house connections whatever shall be made to any of the sanitary sewers until purification works are ready to be placed in service;

5th. That there shall be maintained complete and accurate records of the location of all house connections, and that provision shall be made for the thorough inspection by the city of the installation of all house connections; and,

6th. That unless construction is under way on or before January 1st, 1911, the terms of this approval shall be considered void.

Those voting in the affirmative were: Messrs. Crossland, Hartzell, Hill and Miller.

In the negative, none.

It was moved by Dr. Miller and seconded by Mr. Hill to confirm the Board's action of June 13th, 1910, approving the detailed plans for the development of a public water supply for the village of Bradford, prepared by Mr. Toney C. Hefel, civil engineer of Muncie, Indiana, and submitted May 3rd, 1910, subject to the condition that the approval be considered void unless construction is begun by November 1st, 1910.

Those voting in the affirmative were: Messrs. Crossland, Hartzell, Hill and Miller.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Miller to confirm the Board's actions in the following cases:

May 9th, 1910, the granting of a license to Mrs. Lida M. Bowers to conduct a maternity boarding house and lying-in hospital at 2002 Broadway, Toledo, Ohio.

May 18th, 1910, the granting of a license to Mrs. Lydia Durnell to conduct a maternity boarding house and lying-in hospital at 929 Fruit Avenue, Cleveland, Ohio.

May 24th, 1910, the granting of a license to Mrs. Ella Hastings, to conduct a maternity boarding house and lying-in hospital at 928 Miller Avenue, Columbus, Ohio.

June 7th, 1910, the renewal of the license given to The Florence Crittenton Home to conduct a maternity boarding house and lying-in hospital at 1166 East Main Street, Columbus, Ohio.

Those voting in the affirmative were Messrs. Crossland, Hartzell, Hill and Miller.

In the negative, none.

It was moved by Dr. Miller and seconded by Mr. Hill to confirm the Board's actions approving rules and regulations adopted by the following health officers, serving in lieu of a board of health:

May 5th, 1910, the rules adopted by Louis Hoeffler, health officer of Woodsfield.

May 10th, 1910, the rules adopted by Dr. Charles O. Munns, health officer of Oxford.

May 11th, 1910, the rules adopted by S. I. Rose, health officer of West Unity.

May 26th, 1910, the rules adopted by Dr. Thomas Blair, health officer of Lyons.

June 6th, 1910, the rules adopted by Joseph Chaine, health officer of Toronto.

Those voting in the affirmative were Messrs. Crossland, Hartzell, Hill and Miller.

In the negative, none.

There being no further business the Board adjourned to meet in Sandusky, at 8 P. M. on July 27th, 1910.

Attest:

C. O. PROBST,
Secretary.

JULY MEETING

1910

A regular meeting of the State Board of Health was held at the West House in Sandusky, Ohio, at 2 P. M. July 27th, 1910.

There were present Messrs. Crossland, Miller, Warner, Hartzell, Palmer and Hill.

The authorities of Sandusky having been notified that they would be given an opportunity to appear before the Board at this meeting to be heard in reference to securing approval of the plans for a proposed sewer to be constructed in the southern part of the city, Mr. George Steinemann, city solicitor; Dr. W. D. Hoyer, health officer; Mr. Robert B. Smith, city engineer, and many citizens appeared and were given a hearing.

The matter was referred to executive session.

In response to a citation to appear before the Board and show cause, if any, why the city of Lima should not be required to make certain changes for the protection of its water supply. Mr. W. J. McLaughlin, city solicitor, and Mr. A. L. Metheany, city engineer, representing the city appeared before the Board and were given a hearing. They admitted that these changes should be made but expressed the opinion that the expense for same should be borne by the county commissioners.

The matter was referred to executive session.

Mr. Ben Sherman, mayor, and Mr. Herman Bensman, member of council, representing the village of Minster, appeared before the Board and asked that the Board's action disapproving the sewer plans submitted by Mr. J. E. House of Wapakoneta, consulting engineer, on June 2nd, 1910, be reconsidered.

The Board then went into executive session.

The question of approving the plans, submitted May 19th, 1910, by Mr. George Steinemann, city solicitor, for a proposed sewer to be constructed in the southern part of the city of Sandusky was taken up for consideration.

It was moved by Mr. Hill and seconded by Dr. Miller that the city of Sandusky be required to submit plans for a new water intake at the October meeting of the Board, and that action in regard to the sewer plan be withheld until that time.

Those voting in the affirmative were Messrs. Crossland, Miller, Warner, Hartzell, Palmer and Hill.

In the negative, none.

The Board then took up the question of the pollution of the Lima water supply.

It was moved by Mr. Hill and seconded by Mr. Hartzell that the report of the Board's committee and the recommendations therein contained be now approved and confirmed.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Miller, Warner, Hartzell, Palmer, and Hill. Nays, none.

It was thereupon moved by Mr. Hill and seconded by Mr. Hartzell that it is hereby declared to be necessary that the city of Lima be required to provide on or before January 1st, 1911, necessary sewers, channels or other means that will successfully convey all objectionable drainage now entering the ditch passing the Allen County Infirmary and entering the Ottawa River near the water works intake to a point well below the reservoir where it will not endanger the public water supply of Lima.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Miller, Warner, Hartzell, Palmer, and Hill. Nays, none.

Thereupon, it was moved by Mr. Hill and seconded by Mr. Hartzell that the report and findings of the Board be transmitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Miller, Warner, Hartzell, Palmer and Hill. Nays, none.

The question of approving the plans for a proposed system of storm water sewers for Minster, with outlets into the Miami and Erie Canal, located at Fifth Street and Third Street, respectively, was taken up for reconsideration.

It was moved by Mr. Hill and seconded by Dr. Warner that the plans for this proposed system of storm water sewers, submitted by Mr. J. E. House of Wapakoneta, consulting engineer, on June 2nd, 1910, be approved provided council of Minster pass an ordinance prohibiting the use of these sewers for sanitary purposes. (Ordinance passed August 1, 1910.)

Those voting in the affirmative were Messrs. Crossland, Miller, Warner, Hartzell, Palmer and Hill.

In the negative, none.

The Board then took up for consideration the question of the contamination of the water supply of Bellaire.

It was moved by Mr. Hill and seconded by Dr. Miller that the report of the Board's committee and the recommendations therein contained be now approved and confirmed except that the time given for completing the changes required to place the water purification works

in readiness for use be six months from the date of the approval of the Board's order by the Governor and the Attorney General.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Miller, Warner, Hartzell, Palmer and Hill, Nays, none.

It was thereupon moved by Mr. Hill and seconded by Dr. Miller that it is hereby declared to be necessary that the city of Bellaire be required to make such installations, repairs and changes as are necessary to place the water purification works in readiness for use within a period of six months from the date of the approval of the Board's order by the Governor and the Attorney General, and that the city of Bellaire be required to engage the services of a competent consulting engineer with instructions to prepare plans for such installations, repairs and changes, said plans to be approved by the State Board of Health.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Miller, Warner, Hartzell, Palmer and Hill. Nays, none.

Thereupon, it was moved by Mr. Hill and seconded by Mr. Hartzell that the report and findings of the Board be transmitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Crossland, Miller, Warner, Hartzell, Palmer and Hill. Nays, none.

The minutes of the June meeting were then read and approved.

The Secretary presented his report, which was on motion of Dr. Warner ordered filed.

Matters previously acted upon by mail were then taken up for confirmation as follows:

It was moved by Dr. Palmer and seconded by Dr. Miller to confirm the Board's action approving, July 15th, 1910, a tract of land lying between Tuscarawas River and the Pennsylvania Railroad and extending 200 feet north from Cherry Street, Canal Fulton, for the location of water works wells, said wells to extend to a depth of at least 200 feet and to be protected against the entrance of water from any stratum less than 200 feet from the surface, upon the conditions:

1st. That the said tract of land be abandoned should the quality of the water deteriorate;

2nd. That the State Board of Health be notified of the drilling of additional wells; and,

3rd. That this approval be considered void unless the new water works plant is completed on or before January 1st, 1912.

Those voting in the affirmative were Messrs. Crossland, Miller, Warner, Hartzell, Palmer and Hill.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Dr. Warner to con-

firm the Board's action of July 23rd, 1910, approving plans and specifications for sewage purification works for the village of Jackson, submitted July 16th, 1910, by Mr. W. H. Monahan, village engineer, upon the following conditions:

1st. That the proper operation of automatic apparatus for diverting the sewage on to and withdrawing the effluent from the contact beds be demonstrated to the satisfaction of the engineer of the State Board of Health;

2nd. That samples of all contact material and filtering material be submitted to and receive the approval of the engineer of the State Board of Health;

3rd. That there be maintained complete and readily accessible records of the location, purpose, and construction of all house connections made to the sewers;

4th. That as soon as the sewage purification works are completed, there be appointed by the village a competent person as superintendent of sewerage, whose duties it shall be to maintain entire supervision over the sewerage system and sewage purification works and be responsible for their proper operation and maintenance; and,

5. That this approval be considered void unless contracts for the construction of the works are awarded on or before September 1st, 1911.

Those voting in the affirmative were Messrs. Crossland, Miller, Warner, Hartzell, Palmer and Hill.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Miller to confirm the Board's action of June 23rd, 1910, renewing the license to the Florence Crittenton Home, to conduct a maternity boarding house and lying-in hospital at 1101 McGuffey Street, Youngstown, O.

Those voting in the affirmative were Messrs. Crossland, Miller, Warner, Hartzell, Palmer and Hill.

In the negative, none.

It was moved by Dr. Miller and seconded by Mr. Hill to confirm the Board's action of July 15th, 1910, granting a license to Dr. F. A. Kautz to conduct a maternity boarding house and lying-in hospital at 2839 Clifton Avenue, Cincinnati, Ohio.

Those voting in the affirmative were Messrs. Crossland, Miller, Warner, Hartzell, Palmer and Hill.

In the negative, none.

It was moved by Dr. Miller and seconded by Dr. Palmer to confirm the Board's actions approving health officers appointed by their respective councils to serve in lieu of a board of health since the last meeting.

Those voting in the affirmative were Messrs. Crossland, Miller, Warner, Hartzell, Palmer and Hill.

In the negative, none.

The Secretary presented a report on proposed sewerage for a portion of Sewer District No. 1, Conneaut.

It was moved by Dr. Miller and seconded by Dr. Warner to approve the plans for proposed sewerage for a portion of Sewer District No. 1, Conneaut, as shown on blue print submitted by Mr. T. F. Lininger, city engineer, June 20th, 1910, provided:

1st. That the outlet, at the foot of Center Road be extended by means of iron pipe into the center of the river and discharged below low water level; and

2nd. That this approval be valid until January 1st, 1912.

Those voting in the affirmative were Messrs. Crossland, Mililer, Warner, Hartzell, Palmer and Hill.

In the negative, none.

The Secretary was instructed to call the attention of the authorities to the fact that the sewage from Conneaut will before many years have to be purified, and steps should be taken at the present time toward making plans for constructing an intercepting sewer and purification works, and also toward purchasing a site for proposed works.

The Secretary presented a report on proposed additional water supply for the village of Cadiz.

It was moved by Dr. Miller and seconded by Dr. Warner to approve the new wells known as Nos. 6, 7 and 8, and located an average distance of about 3,000 feet southwest of the existing pumping station, as an additional water supply for the village of Cadiz.

Those voting in the affirmative were Messrs. Crossland, Miller, Warner, Hartzell, Palmer and Hill.

In the negative, none.

The Secretary presented a report on a proposed water supply for the village of Waverly, to be derived from wells located west of Crooked Creek and near the built up portion of the village.

Dr. Warner moved that this matter be referred to a committee consisting of a member and the chief engineer for further investigation. Carried.

The President appointed as members of this committee, Dr. Warner and the chief engineer.

The question of the water supply of Lakeside was taken up for consideration. The Secretary presented a report on proposed additional water supply. The laboratory examinations of samples of water from wells drilled at the pumping station and in the park east of the boat landing were not altogether satisfactory. The examination of the filter plant showed that little or no purification of the lake water is effected by it.

As a result of his recent investigation at Lakeside, Dr. Warner moved that the Board discourage the putting down of more wells until

tests and examination of the present wells could be made, and that the lake water be not used for drinking or domestic purposes unless boiled. Carried.

The Secretary reported that in 1906, in response to a call from the health officer of Kelleys Island because of an unusual amount of typhoid fever then existing, the condition of the several public water supplies at the island were investigated, and a letter sent to the manager of The Kelleys Island Lime and Transportation Company containing certain recommendations; that recent investigation had shown that no action had been taken toward improving any of the supplies and that the water was being taken from the intakes dangerously located.

It was moved by Dr. Miller and seconded by Dr. Warner that The Kelleys Island Dock and Steamboat Company be required to submit plans for the purification of their water supply, or for extending the intake beyond all contaminating influences; and that the The Kelleys Island Line and Transportation Company be required to submit plans for the purification of the water from their northerly intake, or for extending the intake beyond all contaminating influences; the said plans to be submitted to the State Board of Health before September 15th, 1910.

This motion was carried.

The Secretary stated that owing to the absence of the Governor and the Attorney General he had been unable to submit to them the Board's order requiring The Victor Stamping Company to submit plans on or before August 10th, 1910, for the abatement of the nuisance complained of, and requiring that such changes and improvements as regards the disposal of sewage and other wastes be made on or before January 1st, 1911, as will remove the nuisance complained of to the satisfaction of the State Board of Health. It would therefore be necessary to change these dates.

It was moved by Mr. Hill and seconded by Mr. Hartzell that the time for submitting plans to the State Board of Health be within three months from the time the Board's order is approved by the Governor and the Attorney General, and that the changes and improvements be made on or before May 1, 1911.

Those voting in the affirmative were Messrs. Crossland, Miller, Warner, Hartzell, Palmer and Hill.

In the negative, none.

The Secretary stated that arrangements should be made for the joint meeting with boards of health of Southern Ohio in connection with the October meeting of the Board.

On motion of Mr. Hill, it was voted to hold this meeting in Cincinnati and the President and Secretary were authorized to prepare the program.

The Secretary stated that there was a vacancy in the engineering staff and that Mr. L. H. VanBuskirk of the laboratory staff, who had

had engineering training and was satisfactory to Mr. Pratt, desired to be transferred to this position.

On motion of Dr. Miller, seconded by Mr. Hill, the Secretary was authorized to make this transfer, and to secure an assistant for the laboratory to take the place of Mr. VanBuskirk.

A communication from The Cleveland Chamber of Industry, per A. E. Hyre, Secretary, was presented, complaining of the condition of the West 25th Street sewer in the city of Cleveland, which was built by the old corporation of Brooklyn Village.

This matter was referred to Dr. Miller and the chief engineer for investigation and report.

A letter was presented from Mr. Rickards, the chief of the laboratory, in regard to attending the meeting of the American Public Health Association at Milwaukee as a delegate of the Board.

No action was taken.

The committee appointed to consider the applications for the appointment as plumbing inspector reported that they had been unable to agree upon a candidate and asked that the committee be continued with instructions to give the matter further consideration.

On motion of Mr. Hartzell, it was voted to grant this request of the committee.

Mr. Hill, as special committee of one, appointed to consider the writing of the special report upon garbage and waste disposal, reported that having canvassed the situation he would recommend that the report be finished by Mr. Pratt and his assistants.

On motion of Dr. Warner, seconded by Dr. Miller, it was voted to adopt this report and recommendation.

Dr. Crossland brought up the matter of the inspection of maternity boarding houses and lying-in hospitals and stated that in his judgment this work was not sufficient in amount to warrant the employment of an inspector at a salary of \$2,000 a year. He moved that a committee of one be appointed to investigate this matter and report to the Board at its next meeting.

This motion was carried and Dr. Crossland was appointed as the committee.

Dr. Crossland brought up the matter of free distribution of diphtheria antitoxin and moved that a committee of three, of which the Secretary should be one, be appointed to consider and report upon the matter.

The motion was carried and the committee, consisting of Dr. Crossland, Dr. Warner and the Secretary, was appointed.

There being no further business, the Board adjourned.

Attest:

C. O. PROBST,
Secretary.

OCTOBER MEETING

1910

A regular meeting of the State Board of Health was held at the Sinton Hotel, Cincinnati, at 8 P. M., October 19, 1910.

There were present: Messrs. Hill, Warner, Crossland, Hartzell and Miller.

The mayor, John M. Ankele, and the city solicitor, Frank A. Bolton, of Newark, were present, a communication having been received from the mayor relative to the status of their present health officer. The health officer, Dr. W. H. Knauss, was also present.

The city solicitor stated that he had had a conference with the health officer and they had both agreed that they would not ask the State Board of Health at this time to take any action in regard to the health officer.

The matter was referred to executive session.

Representatives from Ironton were present in regard to the improvements in the public water supply of that city. Mr. David James, Mr. Adolph Schubert and Mr. Moore, councilmen, and Mr. H. M. Paul, clerk of council, were present and urged the Board to grant further time in which to put in a test well, as recommended by the consulting engineers, Messrs. Burgess, Kimberly and Long, who were called into the case and whose report had been submitted to the Board.

The mayor, Mr. C. W. Golden, and Dr. Lester Keller, of Ironton, represented the board of health, and urged that this was a useless expenditure and that the State Board of Health should require that steps be taken at once looking toward the installation of a proper supply.

The matter was referred to executive session.

A large delegation, some forty in number, mostly citizens of Cincinnati, including the health officer, Dr. J. H. Landis, and the health officer of Terrace Park, Dr. J. K. Scudder, appeared before the Board, urging that the village of Milford be restrained from polluting the Little Miami River.

The Secretary stated that this matter had already come before the Board in the shape of a great many complaints from people along the river below Milford, and that an investigation and report had been made by Mr. Hill, member of the Board, who was appointed a committee of one for that purpose.

He further stated, that the authorities of Milford had been notified that the matter would be considered at this meeting and were invited to be present.

The complaints concerned the use of a certain storm water sewer in Milford for sewage purposes. This storm water sewer had been ap-

proved by the State Board of Health in 1907 but only upon the condition that there should be no additional discharge of putrescible wastes or sewage into the proposed sewer, or existing sewers that might become tributary thereto.

After some discussion, it was moved by Dr. Warner and seconded by Mr. Hill, that the village of Milford be prohibited from using this storm sewer for the purpose of carrying household wastes or other putrescible matter to the Little Miami River unless properly purified.

Those voting in the affirmative were Messrs. Hill, Warner, Crossland, Hartzell and Miller.

In the negative, none.

Mr. Otto Magley, Secretary and superintendent, and Mr. H. C. Hopkins, treasurer, of the Lakeside Campmeeting Association, appeared before the Board in regard to improving the water supply of Lakeside.

In this connection a communication from Mr. W. E. Hoyer, president of the Lakeside Property Owners' Association, was read, requesting the Board to require improvement in the sewerage facilities at Lakeside.

On motion of Mr. Hill, it was voted to appoint a committee, consisting of a member of the Board and the chief engineer, to investigate the water supply and sanitary conditions at Lakeside and report to the Board.

The President appointed Mr. Hill and the chief engineer, Mr. Pratt, members of this committee.

Mr. J. A. Stewart, consulting engineer, presented plans for sewerage for the village of Kennedy Heights.

On motion of Dr. Warner, these were referred to the chief engineer for investigation and report.

Thereupon the Board adjourned until 9:30 A. M. of the following day.

SECOND SESSION.

The Board reassembled at 9:30 A. M. October 20, 1910, all members being present except Dr. Crossland.

The minutes of the last meeting were read and, on motion of Mr. Hill, approved.

The Secretary read his report and on motion of Dr. Warner, seconded by Mr. Hartzell, the report was approved and ordered filed for publication.

The Board then took up, for consideration the complaint of the trustees of Paris Township, Union County, that the village of Marysville is discharging and permitting to be discharged sewage and other wastes into Mill Creek and by reason thereof is so corrupting said creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of said

township living in the vicinity of Mill Creek. Having before it the report of the committee heretofore appointed by this Board to investigate the complaint, the same was, on motion of Mr. Hill, seconded by Mr. Hartzell, ordered read.

The report was then read.

It was then moved by Mr. Hill and seconded by Mr. Hartzell that the Board finds from the report of its committee, and other evidence, that Mill Creek at and below the village of Marysville is badly polluted by the sewage and other wastes from said village, and that conditions thereby created are detrimental to the health and comfort of the citizens of Paris Township, Union County, residing in the vicinity of said creek.

The roll call upon the adoption of this motion resulted in Yeas: Messrs. Hill, Warner, Hartzell and Miller. Nays, none.

Thereupon it was moved by Mr. Hill and seconded by Mr. Hartzell that the Secretary of this Board notify the authorities of the village of Marysville of the Board's findings, and that the Board has fixed 8 P. M. Wednesday, the eighteenth day of January, 1911, at the office of the Secretary in Columbus, as the time and place, when and where the authorities of Marysville by their officers, or others, may have an opportunity to be heard and to show cause, if any, why the village should not be required to install sewerage and sewage purification works on or before July 1, 1911, the plans for same to receive the approval of the State Board of Health.

The roll call upon the adoption of this motion resulted in Yeas: Messrs. Hill, Warner, Hartzell, and Miller. Nays, none.

The Secretary then presented the following letter from the chairman of the Sewer and Drainage Committee of the council of Marysville:

MARYSVILLE, OHIO, October 17, 1910.

"DR. C. O. PROBST, *Hotel Sinton, Cincinnati, O.*

"DEAR SIR:—

"Referring further to our 'phone conversation of this afternoon, I am pleased to advise you that the Sewer and Drainage Committee have been authorized to engage the services of a competent sanitary engineer for the purpose of making the plans for going ahead with a comprehensive system of sewerage for our city.

"The committee has this matter well under way. The council has already held a public meeting for consideration of the subject in general and the general expression favors pushing the project through as soon as can be done. The matter will be referred to the people's vote in the very near future, and we feel sure that the work can be completed next season.

Yours very truly

(Signed) C. C. ARMSTRONG,

"Chairman Sewer and Drainage Committee, Council of Village of Marysville, Ohio."

The Secretary presented a petition from the board of health of Lima, Ohio, complaining that the village of Ada, by the discharge of

sewage and other wastes into Ottawa River is polluting said stream, which is the source of the Lima public water supply.

On motion of Mr. Hill the matter was referred to a committee consisting of a member and the chief engineer for investigation and report.

The Chair appointed Mr. Hill to act on this committee with the chief engineer, Mr. Pratt.

The Secretary presented a report on the Mike Huff Spring as a source of additional water supply for the village of Leesburg.

It was moved by Dr. Warner and seconded by Mr. Hill that this spring, located about 500 feet northwest of the present public supply, be approved provided:

1st. That the village purchase or obtain absolute control over all land within 250 feet of the spring and that no houses, stables, privies, or possible sources of pollution of any kind be allowed to be placed thereon;

2d. That all cesspools and privy vaults within 600 feet of the spring be made water-tight and cleaned at regular intervals at the direction of the local health department; and

3d. That this approval be valid only until July, 1911.

Also, it should be understood, in giving this approval, that it is not expected by the State Board of Health that the quantity of water available from the Mike Huff Spring will entirely supply the present deficiency of the public water supply.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

The Secretary presented a report on the development of proposed new water supply for Shreve.

It was moved by Dr. Warner and seconded by Mr. Hill that the plans for the development of Sheard Spring, submitted by Mr. O. B. Parsons, engineer for the village, on September 1, 1910, in accordance with Condition 2 of the Board's approval of this spring as a source of supply (May 17, 1910) be approved upon the condition that there be provided three inlets from the spring into the collecting reservoir, the said inlets to be placed at or just above, the bottom of the spring.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

The Secretary was instructed to inform the engineer of the village that the Board is of the opinion that his plan of placing a heavy pumping engine on the roof of the collecting reservoir is not in accordance with the safest practice, and that it would be better to provide a more solid foundation for the machinery.

The Secretary presented a supplementary report on the proposed water supply for Waverly, by Dr. Warner and the chief engineer, who

were appointed a committee to make a further investigation of this supply.

It was moved by Mr. Hill and seconded by Mr. Hartzell that the wells located on land south of the electric light power house and west of Crooked Creek at the edge of the village of Waverly be approved provided a purification plant of a design satisfactory to the State Board of Health is installed and placed in operation before the water is offered to the consumers.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

The Secretary was instructed to call the attention of the authorities at Waverly to the letter addressed to the mayor and council under date of August 11, 1910, advising the village to seek a well supply outside of the village, and state the importance of following this advice had been recently emphasized by the fact that an analysis of a well located near the Norfolk and Western Railroad station, about one mile east of the center of the village, has shown a water which contains very little iron and in all respects is superior to the water in the proposed wells. If there could be obtained a sufficient supply of water of the quality shown by the analysis of this Norfolk and Western well, such water would be satisfactory without any treatment and the village would be saved the expense which is necessary for the installation and maintenance of a purification plant, such as is proposed.

The Board then went into executive session.

The question of the water supply of Ironton was taken up for consideration.

It was moved by Mr. Hill and seconded by Dr. Warner, that the Board permit the authorities of Ironton to proceed with the proposed test, as recommended by the consulting engineers, Messrs. Burgess, Kimberly and Long, with the understanding that a report with results of the test be submitted to the State Board of Health within thirty days.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hartzell, Warner, Hill and Miller. Nays, none.

The question of the appointment of a health officer of the city of Newark was taken up.

It was moved by Dr. Warner, duly seconded, that in as much as the attention of the council of Newark had but a few days previously been called to the fact that council had failed to appoint a board of health, as required by law, the Board should take no action in the matter, and allow council a reasonable time in which to appoint a board of health.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

The Secretary presented a report on proposed storm sewer for Piqua.

It was moved by Mr. Hill and seconded by Dr. Warner that the plans submitted October 18, 1910, by Mr. Albert Schroeder, city engineer, for a storm water sewer at Piqua to discharge into the Miami and Erie Canal be approved with the understanding that the Board's approval shall become void unless the said sewer is constructed before January 1, 1912.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

The Secretary presented a report on automatic controlling apparatus proposed for use in the sewage purification plant under construction at Galion, a plan having been received from the Pacific Flush Tank Company on September 20, 1910, in accordance with Condition 2 of the Board's approval (July 20, 1908) of the plans for sewerage and sewage purification for the city of Galion.

It was moved by Dr. Warner and seconded by Mr. Hill to approve this plan of the automatic controlling apparatus proposed for use in the Galion plant.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

The Secretary presented a resolution to appoint an inspector of milk, and an order to regulate the sale of milk, in the village of Carey, adopted by Joseph F. Wonder, health officer of that village, serving in lieu of a board of health.

It was moved by Mr. Hill and seconded by Dr. Warner to approve this resolution and order.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

The Secretary presented an order relating to the use and construction of privy vaults and cesspools and the removal of waste substances in the village of Shreve, Ohio, adopted by James H. Andress, health officer, serving in lieu of a board of health.

It was moved by Mr. Hill and seconded by Dr. Warner to approve this order.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

The President appointed Dr. Warner chairman of the Finance Committee for the ensuing year.

On motion of Dr. Warner, the Secretary was instructed to prepare suitable resolutions upon the death of Dr. Darwin G. Palmer.

The Secretary reported that additional help was needed in the laboratory and engineering department; that an appropriation was available

to pay for such help, and recommended that the Board employ a boy for the laboratory at the rate of \$16.00 per month, and a messenger for the engineering department at \$30.00 per month.

On motion of Mr. Hill, duly seconded, the Secretary was authorized to make such arrangement.

The Secretary reported that he had consulted Mr. Eagleson, the Board's advisor in the Attorney General's department, in regard to paying Mr. Hansen for one month's extra work, which he had performed for the Board, and that Mr. Eagleson had stated that he considered such payment could be legally made and would render such opinion in writing, if desired.

On motion of Mr. Hartzell, seconded by Mr. Hill, the Board voted to pay Mr. Hansen for his month's work provided the Attorney General gave a written opinion that this could be legally done.

Attention was called to the meeting of the American Association for the Study and Prevention of Infant Mortality, to be held in Baltimore, Md., November 9 to 11, 1910.

On motion of Mr. Hill, duly seconded, Dr. Warner and the Secretary were appointed to represent the Board at this meeting.

A motion of Mr. Hill prevailed, that a special meeting of the Board be held in Cleveland sometime during the month of November to consider the report of the committee appointed to attend the Baltimore meeting, with suggestions that might develop as to what further action the Board might take along the lines of the prevention of infant mortality.

The Secretary presented a communication from Mr. E. M. Van Cleve, president of the Ohio Commission for the Blind, asking that the Board officially endorse a circular which that Commission proposed to distribute on the subject of phlyctenular keratitis as the cause of blindness.

On motion of Mr. Hill, seconded by Mr. Hartzell, it was voted to grant such endorsement.

A communication was read, from Mr. F. H. Eno of Columbus, consulting engineer for the city of Cambridge, asking for more time in which to prepare the plans for a new water supply for that city.

It was moved by Mr. Hartzell and seconded by Mr. Hill, that the time for the presentation of these plans be extended to the time of the Board's January meeting.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

A report of the work done in the laboratory for the last quarter was read and on motion of Mr. Hall, seconded by Dr. Warner, approved.

The President and Secretary were authorized to make such arrange-

ments for the meeting of State and city and village boards of health in Columbus in January as they might deem advisable.

A request from Dr. Crossland was presented, asking that two additional members be added to his special committee to investigate and report upon the duties of the inspector of maternity boarding houses and lying-in hospitals.

On motion of Mr. Hill it was voted to take this action, and the Chair appointed Dr. Warner and Mr. Hill as additional members of this committee.

Matters previously acted upon by mail were taken up for confirmation as follows:

It was moved by Mr. Hartzell and seconded by Dr. Warner to confirm the action of September 3, 1910, approving plans for a sewage purification plant for Correction Square, the city workhouse of Cleveland, located at Warrensville, submitted by Mr. Robert Hoffman, chief engineer for the department of public service, on July 30, 1910, provided:

1. That samples of sand to be used for filtering material be submitted to the engineer of the State Board of Health for approval before being placed; (Sample No. 6 submitted and approved by the engineer September 27, 1910).

2d. That plans of the automatic dosing apparatus be submitted to the engineer of the State Board of Health for approval before being installed; and, (Submitted, October 29, approved November 1, 1910).

3d. That this approval be void unless construction work had been begun by January 1, 1912.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

It was moved by Dr. Warner and seconded by Mr. Hill to confirm the Board's action of September 21, 1910, approving plans for a mechanical filter plant to purify the existing water supply of Port Clinton, as shown on drawings and described in specifications submitted by Mr. William G. Clark of Toledo, consulting engineer for the village, on September 10, 1910, provided:

1st. That plans showing all details of piping and strainer system, controllers, and coagulant devices, as these are to be actually installed, be submitted to and receive the approval of the State Board of Health before the contract for the work is awarded;

2d. That in case the contractor's plans for the filter equipment are adopted by the local authorities, in accordance with Article 5 of the specifications, the contractor's guarantee shall be submitted to and receive the approval of the State Board of Health before the contract is awarded:

3d. That any test which may be carried out in order to ascertain

the efficiency of the filter plant before its acceptance, be made to cover a period when the lake water contains the maximum amount of turbidity;

4th. That the size of the coagulating basins be enlarged whenever in the opinion of the State Board of Health the increased water consumption of the city warrants such enlargement; and,

5th. That this approval be valid only until January 1, 1912.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

The Secretary was instructed to advise the local officials that while good results can be obtained by the proposed plant with proper operation, yet it would be desirable to extend the present intake into deep water beyond the direct influence of the Portage River, in order that there may be obtained a water which can be more easily and economically purified.

It was moved by Mr. Hartzell and seconded by Dr. Warner to confirm the Board's action of September 21, 1910, approving plans submitted September 2, 1910, by Mr. William Wilson of Youngstown, consulting engineer for the village of Hubbard, for a sewerage system and sewage purification plant for that village provided;

1st. That samples of all filtering material be submitted to the chief engineer of the State Board of Health for approval before the same is placed; and,

2d. That this approval be valid only until January 1, 1912.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

It was moved by Dr. Warner and seconded by Mr. Hill to confirm the Board's action of September 29, 1910, disapproving the plan submitted July 16, 1910, by Mr. O. P. Wilson, city engineer, for a proposed sewer to be constructed in Kenton, to discharge into the Scioto River between Main Street and Wayne Street.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

The Secretary was instructed to call the attention of the authorities to the fact that the Leighton Street sewer had been illegally constructed, as the plans for the sewer were disapproved by the State Board of Health; and to urge that steps be at once taken for providing a modern and efficient sewerage system for Kenton, including the construction of an intercepting sewer extending down the Scioto River to purification works.

It was moved by Mr. Hill and seconded by Mr. Hartzell to confirm the action of September 29, 1910, granting permission to the city of Newark, until further examinations by the State Board of Health have

determined that the water will be satisfactory for permanent use, to temporarily introduce into its distribution system, to be used for domestic and all other purposes, the water from the new system of infiltration wells located in the Licking River opposite the city's pumping station.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Mr. Hill to confirm the Board's actions approving health officers appointed since the last meeting to serve in lieu of a board of health.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

It was moved by Mr. Hill and seconded by Mr. Hartzell to confirm the Board's action of August 18, 1910, approving rules and regulations governing the construction and use of cesspools in the village of Rockport, adopted by the health officer, Dr. Charles L. Wood, serving in lieu of a board of health.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Warner to confirm the Board's action of September 28, 1910, approving an order relating to the cutting of brush, briars, burs, vines, Russian, Canadian or common thistle, or other noxious weeds, adopted by the health officer of Bridgeport, Mr. Louis R. Cook, serving in lieu of a board of health.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Mr. Hill to confirm the action of September 9, 1910, renewing the license of Evangeline Reanis to conduct a maternity boarding house and lying-in hospital at 73 North Harris Avenue, Columbus.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Warner to confirm the action of October 4, 1910, granting a license to Mrs. Sophie Butz to conduct a maternity boarding house and lying-in hospital at 3276 West 46th Street, Cleveland; and to Mrs. Florence May Fields to conduct such a place at 929 Fruit Avenue, Cleveland.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Warner to confirm

the Board's action of October 13, 1910, granting a license to Mrs. Anna Leinesch to conduct a maternity boarding house and lying-in hospital at 2703 Colerain Avenue, Cincinnati.

Those voting in the affirmative were Messrs. Hill, Warner, Hartzell and Miller.

In the negative, none.

There being no further business, the Board adjourned.

Attest:

C. O. PROEST,
Secretary.

DECEMBER MEETING

1910

A special meeting of the State Board of Health was held at the Hollenden Hotel, Cleveland, Wednesday evening, December 7, 1910, at 8 o'clock.

There were present Drs. Miller, Warner, and Crossland, Mr. Hartzell and Mr. Hill.

The mayor, Dr. H. H. Hartman, and the city solicitor, Mr. H. R. Schuler, of Galion, were present and stated that their trunk sewer and some laterals had been completed and their sewage disposal plant was practically finished, except for filtering material. They asked permission to connect some lateral sewers with the trunk sewer, without waiting for the completion of the purification plant, in order to care for sewage now being discharged into Pickel Run. They stated that their disposal plant would probably be ready to receive all the sewage by the last of March, 1911.

On motion of Mr. Hill, duly seconded, this request was granted.

Those voting in the affirmative were Messrs. Miller, Warner, Crossland, Hartzell and Hill.

In the negative, none.

Mr. L. E. Chapin, of Canton, consulting engineer for the city of New Philadelphia, presented a communication and plans for sewerage and a sewage disposal plant for that city. He stated that if the Board would grant permission to begin the construction of certain sewers in 1911, council would secure a site for a disposal plant and would have such plant in operation by 1913.

On motion of Mr. Hill, the communication and plans were referred to the chief engineer for investigation and report.

The committee, consisting of Dr. Warner and the Secretary, presented the following report on their attendance at the First Annual Meeting of the American Association for the Study and Prevention of Infant Mortality, held in Baltimore, Md., November 9-11, 1910:

REPORT OF DELEGATES TO THE FIRST ANNUAL MEETING OF THE AMERICAN ASSOCIATION FOR THE STUDY AND PRE- VENTION OF INFANT MORTALITY.

Mr. President and Members of the State Board of Health:

The meetings were held at Johns Hopkins University, Baltimore, November 9th to 11th. The attendance was large and composed of health officials, physicians, educators, nurses, etc.

Dr. Knox, president, in opening said inquiry of 148 large cities in the United States showed that 91 were doing more or less active work in the prevention of infant mortality. He urged that the campaign should be along lines of

(a) Co-ordination of forces, such as health departments, hospitals and sanitariums, various charitable and aid societies, milk depots, etc.

(b) Education of mother in care of babies illustrated by her own child.

(c) Education of public by lectures, circulars, etc.

(d) Enforcing or inducing wet nursing wherever possible.

Mr. Kingsley, superintendent of the United Charities of Chicago, said: "The relation of infant welfare work to the general social movement is about the same as that of the baby to the adult population. The baby makes the population, and out of neglected babyhood come the individuals that furnish the task of charity workers, of reform agencies and those engaged in the general social movement."

Mr. Phillips, secretary of the Milk Commission of New York City, discussing milk depots, said that the education of the mother who comes there is of first importance, the distribution of pure milk being secondary. He thought nine-tenths of mothers could be taught how to properly modify and care for the baby's milk. Hence, New York has abandoned its expensive milk laboratory for the preparation of individual bottles of milk, and depends upon instruction of mothers. This has meant a large saving in expenses. Some doubted the feasibility of educating ignorant mothers to do this. He said the cost of saving infants with the aid of milk depots was about \$45.00 per capita, and the cost of burial about \$50.00.

Dr. Baker, a woman in charge of infant mortality work in New York City, told of the organization of The Little Mothers societies. The members are school girls over twelve years. A nurse takes a baby to school and demonstrates how to care for and feed a baby. The little mother cares for a baby at home, and for her own, should she have one, later. There are already 22,000 of them.

Dr. Neff, Health Commissioner of Philadelphia, told of how they had already organized the work in his city under municipal control. A large corps of physicians and nurses was employed by the city to go to the homes of the newly born to instruct the mothers. Results showed a reduction of 36 per cent in districts covered as compared with the previous year.

Dr. Holt of Columbia University said that excessive infant mortality is one of the largest problems of society; largely due to poverty and ignorance, hence hard to combat. All agreed, however, it might be reduced 50 per cent. Must have co-operation of many agencies; need to know facts as regards exact causes of infant mortality to separate preventable causes from those practically inevitable.

Dr. Wile of New York City attacked the medical schools for failure to give adequate instruction in pediatrics. He said: "The present teaching of pediatrics is inadequate, and teaching of hygiene is still more inadequate; the teaching of the relation of infant diseases to social conditions does not exist."

Dr. Newmayer of Philadelphia thought it a mistake to devote so much attention to educating mothers of well children in how to keep them well; that more time should be given to sick children.

Dr. Lucas of Boston, told of classes of fathers formed to consider infant mortality, among the poor foreigners. The fathers usually controlled the family affairs and should be instructed and interested.

Dr. Wilbur, of the Census Bureau, pointed out the woeful lack of accurate statistics in the United States due to inaccurate and incomplete birth records. He said no state and no city in the United States had such records. He defined infant mortality to be "the ratio of number of deaths of infants under one year of age, excluding still births, to 1,000 children born alive."

The session of Educational Prevention of Infant Mortality was quite interesting.

The question of how normal schools are fitting teachers to give adequate instruction in sanitation and hygiene and higher ideals of parenthood, brought out valuable discussion. It was apparent that few or none are doing this.

Dr. Whipple, of Cornell, reviewed the course given there which is fairly satisfactory.

Prof. Flora Rose, of the department of home economics, Cornell, said they gave instructions in the care and feeding of babies; mortality rates as affected by abnormal industrial conditions, disease, environment, etc.

Prof. Jessie Phelps, of the department of biology, Michigan State Normal College, gave a very interesting talk on their course for young women on physiology of sex and development. Beginning with plants and lower animals, leading to man, the whole problem of reproduction is taught. This opens the way for human sexual hygiene; standards of courtship and marriage, prostitution, children's vices, etc.

A large exhibit illustrated the many phases of infant hygiene and infant mortality. One table showed the annual deaths of infants under one year in the civilized countries to be about three and one-fourth millions. A red light, flashing every ten seconds, showing an infant's death, emphasized this.

An important point illustrated by charts with data from various countries was that from 70 to 80 per cent of infants dying under one year of age are bottle fed.

Chicago had an interesting diagram showing the various organized agencies for the prevention of infant mortality; their relations and relative importance. Cincinnati and Cleveland both had good exhibits.

Dr. F. L. Watkins, state registrar, states that last year there were 10,396 deaths of infants under one year in Ohio, 14.5 percent of the total number of deaths.

We ask the Board to consider whether any steps may be taken by the Board to reduce this mortality.

One plan that suggests itself as preliminary to more accurately directed work is to have a traveling lecturer and organizer to visit cities in the first place, and endeavor to enlist public spirited citizens in the formation of child welfare organization.

A traveling exhibit, smaller but along the lines of the one shown at Baltimore would very greatly aid in this preliminary work. Suitable literature could be gotten out and distributed through various channels.

The women's clubs could doubtless be interested.

An organized campaign for pure milk would be helpful.

The Board has been given control of maternity boarding houses and lying-in hospitals, thus establishing a precedent in State oversight of infants through the agency of the State Board of Health, and this Act might be amended to give the Board greatly increased duties and powers for the protection of infant life.

We respectfully submit our report with these suggestions.

(Signed) C. O. PROBST,
FRANK WARNER,
Committee.

On motion of Mr. Hartzell, the report was accepted and filed.

The following report of an inspection of the quarantine station at New York was presented by the Secretary:

REPORT ON THE QUARANTINE STATION AT NEW YORK.

To the State Board of Health:

GENTLEMEN:—

The notification of the arrival at New York from various points in Ohio, of immigrants from cholera infected countries, in some instances upon ships upon

which cholera had appeared, occasioned the inspection of quarantine methods at this port by your President and Secretary. This notification came both from the Commissioner of Immigration and the Surgeon General of the Public Health and Marine Hospital Service, with the suggestion that such immigrants should be kept under observation for a time. In at least one instance, at Cincinnati, such an immigrant was taken off a train and detained in a hospital.

The advisability of such observation of immigrants was suggested by the fact that an immigrant removed from a ship at New York developed cholera about three weeks after possible exposure to the disease. Heretofore it was believed that the extreme incubation period of cholera would not exceed one week, and came within five days in nearly all cases. With a possible three weeks period immigrants might pass quarantine in good health and develop cholera inland thereafter.

Through the courtesy of Dr. Alvah H. Doty, port quarantine commissioner of New York, we were able to make a thorough inspection of quarantine procedures and learn just what measures are taken to guard our country against exotic diseases.

When a vessel arrives from a country where cholera prevails any passenger on board who is ill, or has been ill during passage, is removed to the hospital on Swinburne Island. If there is any possibility of cholera (and a wide latitude is left for atypical cases) the ship and all passengers are held until a bacteriological determination is made. This examination is made in all cases of sickness of whatever nature. If it be cholera the cabin passengers, if there has been no exposure, an unusual thing, are permitted to proceed. Immigrants are landed at Hoffman's Island and kept under observation for five days, and with no sickness developing, are released and permitted to proceed to destination. Should a case of cholera develop here it would be removed to Swinburne Island.

If a ship arrives from a cholera infected country with a history of no sickness during passage, after an inspection of each passenger, if all are well, it proceeds without further delay.

Before the immigrants are permitted to sail for this country from a country where cholera prevails, they are kept isolated, under the observation of officers of the Public Health and Marine Hospital Service for a period of five days, and are not permitted to bring food or liquids, possibly infected, on board with them. Thus immigrants for Ohio from Russia or Italy, the two countries where cholera has prevailed, have been five days, plus the length of voyage and railroad travel, before reaching us.

Dr. Doty said: "It must not be expected that port quarantine can give 100 per cent protection against cholera. We undoubtedly may have carrier cases, and inland communities must be prepared to protect themselves against this small but inevitable danger. No city with a pure water supply and well trained, capable health officer need fear an epidemic of cholera. Should a case pass quarantine there would be scarcely a possibility for the disease to gain a foothold under such circumstances."

The quarantine station has been extended and vastly improved since a visit by one of us in 1892, when the cholera epidemic in Hamburg threatened this country. Facilities are provided for taking excellent care of 1,500 or more passengers. Hospital facilities are ample, and everything was in a scrupulously clean and sanitary condition. An idea of the care and thoroughness exercised may be gained from the statement that a special dairy, controlled in all details by Dr. Doty, supplies milk for the children in quarantine, of which there are always a considerable number, and that consequently diarrhoeal diseases among them during summer months is exceptional.

The most interesting fact brought out by the investigation was that we may

have cholera carriers, people who harbor the germ of cholera and who may or may not develop the disease, perhaps after passing quarantine. Whether we may have cholera carriers who, after recovering from the disease, still carry virulent germs, as is true in typhoid fever, is now being investigated by Dr. Doty.

On the whole it may be said that

(1) Our protection from cholera at port quarantine is as perfect as possible, but not absolute.

(2) That our only complete protection, when the disease prevails in Europe, is pure water supplies and competent officials to take prompt control of cases that may pass quarantine.

(3) That the danger to this country this year has practically passed.

(Signed) WM. T. MILLER,

President.

C. O. PROBST,

Secretary."

November 7th, 1910.

The Secretary presented the following report recommending a Health Exhibit:

REPORT ON A HEALTH EXHIBIT.

The great success of the traveling tuberculosis exhibit in enlisting the public in the fight against this disease has suggested that a similar method could be used with advantage in promoting the work of our Board in other lines. The New York State Board of Health has recently had a very successful Health Exhibit in connection with their State Fair. With this in mind I had a conference with Mr. Sandles, secretary of the State Board of Agriculture, in regard to an exhibit along health lines at the Ohio State Fair, and gave him an outline of what such an exhibit might consist. He entered most enthusiastically into the idea, and promised co-operation and all the space (usually difficult to secure) that we might need. The exhibit could easily be divided into parts suitable for illustrating various phases of public health work, which could be used, when desired, separately from the others, and be transported to any part of the State. For instance one section could be devoted to tuberculosis, with the usual outfit. Another to water supplies with photographs of Ohio and perhaps other water filtration plants. A miniature filtration plant in actual operation would be possible and desirable. The New York board of health has such an exhibit. Wells and the manner in which they are polluted, would be shown. Sewage could be treated in the same manner, or be combined with water. A dairy and milk exhibit, combined, possibly, with many of the features of the exhibit on infant mortality at the Baltimore meeting, mentioned in a former report, could be made very interesting. An exhibit on school hygiene would be useful and others will suggest themselves to you. One of the main features should be an exhibit, in various possible ways, of the work of the Board, which is but little known in its various details. We already have a projectoscope for slides and motion pictures, which could be used in lectures to be arranged for in connection with the exhibit.

This plan was outlined to our President, Dr. Miller, who approved of it, and following our inspection of the quarantine station at New York, a report of which has been submitted, he and your Secretary visited Boston and examined the health exhibit of the Massachusetts State Board of Health, and also Albany, N. Y., to see the exhibit shown by their State Board of Health at the State Fair.

As showing more in detail parts of this exhibit, I have asked the chief engineer, Mr. Pratt, and the chief of the laboratories, Mr. Rickards, to whom I have outlined what was wanted, to submit preliminary reports by them as regards

what might be shown by the Engineering Department and Laboratories as a part of the exhibit, as follows:

REPORT ON PROPOSED SANITARY ENGINEERING EXHIBIT.

COLUMBUS, OHIO, December 6, 1910.

TO DR. C. O. PROBST, *Secretary of State Board of Health.*

DEAR SIR:—On November 11 and 12, 1910, following your instructions, I visited the state health department at Albany, New York, in order to obtain practical information with reference to making a sanitary engineering exhibit which would illustrate the work of the State Board of Health and which would give to the public definite ideas in regard to the problems involved in sanitary engineering. After having obtained what information I could at Albany, I went to New York City and there inspected the public health exhibit which is now being arranged under the direction of the curator of the Department of Public Health, American Museum of Natural History.

As a result of my observations obtained from the sources above mentioned, as well as from discussing the matter with other persons who are interested and qualified to give opinions on the subject, I would suggest that the proposed exhibit comprise the following general features:

1. Three working models showing the three principal methods of purifying municipal or institutional sewage.
2. One or two working models of municipal water purification plants.
3. Maps of the state of Ohio indicating the location of (a) existing municipal sewage purification plants; (b) proposed sewage purification plants; (c) places where sewage purification is or will in the near future be necessary; (d) location of existing water purification plants; (e) location of water supplies which should be purified; (f) location of all public water supplies, making distinction between filtered and unfiltered surface supplies, and ground supplies.
4. Brief statistical information regarding the cost of water works and per capita consumption of water in (a) cities; (b) villages.
5. Charts showing the manner in which it is possible to pollute both public water supply wells and private wells.
6. Charts or models showing practical manner of disposing of wastes from country houses (a) when modern plumbing is used; and (b) when there is no plumbing.
7. Plans and photographs of creamery waste disposal plant.
8. Photographs of typical sewage purification plants, water purification plants, and garbage disposal plants.
9. Photographs of well constructed garbage wagons.
10. Illustrations by photographs of street cleaning methods.

Referring to the models of sewage purification plants, those which were made by the New York state health department were so designed that they would actually operate by passing water through them. In this case there was one septic tank, from which the sewage or rather the water could be conveyed to filters of various types. The whole collection covered a space 6 feet by 12 feet. The tanks and filters were made of wood and painted to represent concrete. Actual sand and stone were used for filtering material. Everything was in true proportion and about 1-50 the size of a plant necessary to treat the sewage of 1,500 people. The pipes, however, which were made of brass or block tin instead of clay or iron, were necessarily a little larger proportionally in order that they might be large enough for the water to pass through without being too much affected by capillary attraction. These models were exhibited at the New York State Fair and are said to have attracted considerable interest among the people from rural com-

munities as well as from cities. The New York department felt well repaid for the trouble and expense in making the models. They were made by a local mechanic and carpenter and cost \$300. Bids were asked from various mechanics and carpenters for price per hour for working on the models, and the lowest responsible bidder or bidders were taken. This was done for the reason that it was impossible to foresee just how much work would be necessary in making the models.

At the American Museum in New York, the models of sewage purification plants, including a part of the Columbus plant, are being made by expert model makers, some of whom are permanently employed at the museum in the making of models of animals, fishes, birds, etc. At this place great attention is being given to the realistic and artistic appearance of the models, which will not be operated. They are made of cement and papier-mache, and covered with sand or fine stone where necessary. The sewer pipes are made of clay and are an exact reproduction of a real sewer pipe but about the size of a lead pencil. Furthermore, small figures of workmen are placed on the plants in order to indicate the duties of the operators.

It is believed that for the purposes of the Ohio State Board of Health it would be more desirable to have working models in order that the principles of operation may be graphically illustrated, than to have non-working plants prepared as is being done in New York City.

Estimate of Cost. It is very difficult to estimate closely the cost of preparing the exhibit outlined above. Of course all of the charts and maps as well as the designs for the working models would be prepared by the regular employees in the engineering department. It would be necessary, however, to retain a model maker or pattern maker who would be qualified to carry out the ideas and instructions of the engineering department. It was learned in New York that one of the model makers of the American Museum of Natural History would be willing to come to Columbus after January 1, 1911, for a period of three months at \$100 a month. There would be an advantage of course in having a man who had been making practically the same kind of models that we desire. On the other hand, no definite information has been obtained in regard to securing the services of some local pattern maker or cabinet maker.

Considering the available information, the following estimate of cost is given:

Labor in constructing models.....	\$300
Material for models.....	200
Photographs	100
Extra drawing material necessary for making plans and charts.....	25
Adding twenty per cent for unforeseen ex- penses the total is.....	780

Respectfully submitted,

(Signed) R. WINTHROP PRATT,

Chief Engineer.

PRELIMINARY PLANS FOR PROPOSED EXHIBIT.

LABORATORY DEPT.

I. DIAGNOSTIC DIVISION.

(a) *Diphtheria.*

1. Parts of outfit and assembled outfit to be shown on bristol board mount with wooden frame (Educational Exhibit Co., mount).
2. Hermetically sealed diphtheria culture.
3. Enlarged photograph or drawing of diphtheria bacilli.
4. Photographs showing taking of culture, inoculation of serum, incubation, examination, etc.

(b) *Tuberculosis*

1. Mounted exhibit of outfit as for diphtheria.
2. Enlarged photograph or drawing of tubercle bacilli.
3. Pictures showing preparation of specimens by shaking, digesting, etc.

(c) *Typhoid*

1. Mounted exhibit as for diphtheria.
3. Photograph or drawing of free-swimming and agglutinated bacilli.

(d) *Malaria*

1. Mounted exhibit of outfit etc.
2. Pictures showing taking of blood, making of smear, staining of specimen, etc.
3. Photograph or drawing of organism in blood cell.

(e) *Rabies*

Framed Instructions :

1. What to ship.
2. How to ship.
3. General instructions.
4. Terse statements in re rabies.
5. How to prevent.

(f) *Ophthalmia*

1. Mounted exhibit of parts of outfit.
2. Pictures showing method of use.
3. Pictures showing result of non-use.
4. Statistics showing preventable blindness.

Miscellaneous.

1. Map showing outfit station locations
2. General aphorisms relative to the laboratory and its work.
3. Cultures of bacteria—non pathogenic—showing method of handling.

II. WATER ANALYSIS DIVISION.

(a) Statistics relating to wells.

(b) Purity of water cannot be judged by physical appearance.

1. Showing gallon bottle of "Bright sparkling water," impurities graphically shown by nesslerized tubes (ammonias) and chlorine shown by silver nitrate etc., formaldehyde plate of bacteria etc.
2. Gallon bottle showing a poor looking water (iron and turbidity) actual (pure) character of the water shown as above.

(c) Well water—Impurities reaching same.

Graphically shown by a cross section of ground, showing impurities from privy and barn reaching well, even when privy is lower than well. Course of polluted water shown by difference in color of sand, etc.

(d) Same as above, showing driven well with introduction of pollution around leaky casing.

(e) Same showing direct pollution of well through cleft of rock.

(f) Leaky platform and leaky casing resulting in pollution of well graphically shown.

(g) Model well showing how to properly guard well.

(h) Model privy with water tight vault.

III. CHARTS SHOWING AMOUNT OF LABORATORY WORK—GROWTH OF LABORATORIES ETC.

IV. PICTURES OF LABORATORY SHOWING EQUIPMENTS.

V. ANTITOXIN DIVISION.

- (a) Mounted exhibit of outfit.
- (b) Map showing location of stations.
- (c) How State label antitoxin may be obtained.
- (d) Statistics showing value of antitoxin.
- (e) Terse truths regarding use of antitoxin.
- (f) Reasons why state should manufacture antitoxin expressed tersely.

Respectfully submitted,

(Signed) B. R. RICKARDS.

The Board now has sufficient funds to assemble a creditable exhibit along these lines, and I would recommend that this be done.

(Signed) C. O. PROBST,

Secretary.

On motion of Mr. Hill, Dr. Warner was appointed a committee of one to consider the question of a health exhibit, with authority to inspect the public health exhibit which is now being arranged by the American Museum of Natural History in New York City.

The Secretary presented a communication from the Auditor of State asking the Board for estimates of appropriations for the work of the Board for the years 1911 and 1912.

On motion of Dr. Warner, duly seconded, it was voted to ask for an appropriation of \$50,000 for the year 1911, and a like sum for the year 1912.

The Secretary presented a financial report, showing expenses for three-fourths of the year, ending November 15, 1910.

It was moved by Mr. Hill and seconded by Dr. Warner, that a committee of two be appointed to consider the report of the Secretary on the financial affairs of the Board, and to report a budget for 1911 and 1912, and to report upon a readjustment of the working staff, if the same be found advisable, and to submit their report thereon at the next meeting of the Board.

This motion was carried.

The Secretary stated that a new building was being erected on the corner of Third and State streets, opposite the State House, and suggested that possibly quarters for the Engineering Department might be secured in that building which would be more convenient than the quarters now occupied in the Harrison Building.

On motion of Dr. Warner, this question was referred to the committee, to be appointed, on financial affairs, as called for in the motion of Mr. Hill.

The President at this juncture appointed Dr. Warner and Mr. Hill members of this committee.

Dr. Warner spoke of the growing work of the Board and moved

that hereafter monthly meetings be held, on the third Thursday of each month at 8 P. M.

This motion was seconded and carried.

On motion of Dr. Warner, it was voted to hold the next meeting in Columbus on December 29, 1910, at 7:30 P. M.

The Secretary brought up the question of the program for the January meeting with local boards of health, and suggested that a few eminent sanitarians from other states be secured.

On motion of Dr. Warner it was voted to secure essayists from Ohio only.

The Board then took up for consideration the complaint of the council of Salem that the city of Salem, located in Columbiana County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into First Culbert Creek, and by reason thereof has so corrupted said creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Salem, Columbiana County, Ohio, who reside in the vicinity of the point of discharge of said sewer. Having before it the report of its committee, heretofore appointed by this Board to investigate the complaint, the same was, on motion of Mr. Hill, seconded by Dr. Crossland, ordered read. The report was then read.

It was then moved by Mr. Hill and seconded by Dr. Warner that the Board does find from the report of its committee, and other evidence, that the sewage of Salem has so corrupted the stream known as First Culbert Creek as to give rise to conditions detrimental to the health and comfort of those residing or owning property in the vicinity of said stream, or below the point of discharge.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Crossland, Hartzell and Hill. Nays, none.

Thereupon, it was moved by Mr. Hill and seconded by Dr. Warner that the Secretary of this Board notify the authorities of Salem of the Board's findings and that the Board has fixed 8 p. m., Wednesday, the twenty-fifth day of January, 1911, at the office of the Secretary in Columbus, as the time and place, when and where the city of Salem, by its officers and others, may have an opportunity to be heard and to show cause, if any, why the said city should not be required to purify its sewage on or before November 1, 1911.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Crossland, Hartzell and Hill. Nays, none.

The Board then took up for consideration the complaint of the health officer of Plymouth, Richland County, Ohio, that the public water supply of that village is impure and dangerous to the health of the consumers of said supply, and having before it the report of its committee,

heretofore appointed by this Board to investigate the complaint, the same was, on motion of Dr. Warner and seconded by Mr. Hill, ordered read.

It was then moved by Dr. Warner and seconded by Mr. Hill that the Board does find from the report of its committee, and other evidence, that the water supply of Plymouth is impure and dangerous to health.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Crossland, Hartzell and Hill. Nays, none.

Thereupon, it was moved by Dr. Warner and seconded by Mr. Hill, that the Secretary of this Board notify the authorities at Plymouth of the Board's findings, and that the Board has fixed 8 P. M. Wednesday, the twenty-fifth day of January, 1911, at the office of the Secretary in Columbus, as the time and place, when and where the authorities of Plymouth by their officers, or others, may have an opportunity to be heard and to show cause, if any, why the village should not be required to provide a suitable water supply for the said village.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Crossland, Hartzell and Hill. Nays, none.

The committee, Mr. Hill and the chief engineer, appointed to investigate the complaint of the board of health of Lima that the water supply of that city was being polluted by the sewage of Ada, presented a statement to the effect that it was thought desirable to postpone the preparation of a definite report in regard to the sewers of Ada until the additional complaint of the Lima health authorities against the water supply of their city made under the Bense Act, should be acted upon.

The Board then took up for consideration the complaint of the board of health of Lima, made under the Bense Act, that the public water supply of the city of Lima, located in Allen County, Ohio, is believed to be impure and dangerous to the health of the consumers of said supply.

Having recently made an extensive study of the public water supply of Lima by committee and through its engineering department, during which some thirty-one samples were collected from the Ottawa River and from Lima Lake and analyzed in the Board's laboratory, the results showing that the water as furnished to consumers is neither safe nor satisfactory for a public water supply; and former investigations of the watershed of the river having revealed danger to the water supply of Lima from the sewage of Ada as well as from other sources, it was moved by Mr. Hill and seconded by Mr. Hartzell that the Board finds that the source of public water supply of Lima is impure and dangerous to health and that it is not possible to sufficiently eliminate the sources of pollution now affecting it except by filtration.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Crossland, Hartzell and Hill. Nays, none.

Thereupon it was moved by Dr. Warner and seconded by Mr. Hartzell that the Secretary of this Board notify the authorities of Lima of

the Board's findings, and that the Board has fixed 8 P. M., Wednesday, the twenty-fifth day of January, 1911, at the office of the Secretary in Columbus, as the time and place, when and where the city of Lima by its officers, or others, may have an opportunity to be heard and to show cause, if any, why immediate steps should not be taken towards installing a water purification plant for the city of Lima, or securing a new supply satisfactory to the State Board of Health.

The roll call for the adoption of this motion resulted in Yeas, Messrs. Miller, Warner, Crossland, Hartzell and Hill. Nays, none.

The Secretary presented a report upon a site for the location of a district tuberculosis hospital for the counties of Darke and Miami.

On motion of Dr. Warner, duly seconded, it was voted to approve the site known as the Pearson farm, a tract of 60 acres located just south of the city of Troy.

Those voting in the affirmative were Messrs. Miller, Warner, Crossland, Hartzell and Hill. In the negative, none.

A report of the committee, consisting of Mr. Hill and the chief engineer, on the water supply and sanitary conditions at Lakeside was presented.

On motion of Dr. Warner, seconded by Mr. Hartzell, it was voted to adopt the report and also its recommendation, which were as follows:

"In reply to the request of the officials of The Lakeside Campmeeting Association that they be permitted to use wells as a source of water supply, it is recommended by your committee that such wells be disapproved on the ground that it would be impracticable to obtain enough water from the ground to constitute a suitable water supply, and furthermore, that certain analyses have indicated that the ground water is at times polluted.

"It is further recommended: First, that The Lakeside Campmeeting Association be notified that the State Board of Health will expect it to submit for approval at the meeting of the Board to be held January 25th, 1911, definite plans for installing a water purification plant of ample capacity prior to July 1st, 1911; and second, definite plans for screening the sewage of Lakeside and discharging same through an iron pipe terminating in several outlets at least 1,100 feet from shore."

Those voting in the affirmative were Messrs. Miller, Warner, Crossland, Hartzell and Hill. In the negative, none.

Matters previously acted upon by mail were then taken up for confirmation as follows:

It was moved by Dr. Warner and seconded by Dr. Crossland to confirm the action of November 16, 1910, approving the plans submitted on September 10, 1910, by Mr. Charles Brossman, consulting engineer, for a proposed public water supply for the village of Dunkirk, to be obtained from drilled wells located on the Baughman site provided:

1st. That all supply wells be cased through surface deposits and

porous limestone into the solid rock and obtain their water from depths of 40 feet or more;

2d. That the village purchase or otherwise control the property east of the test well for a distance of 400 feet;

3d. That all present and future privies within 500 feet of any supply well be constructed with surface boxes maintained watertight and closed from the air and regularly cleaned; and,

4th. That this approval be considered void unless construction shall have been begun prior to April 1, 1911.

Those voting in the affirmative were Messrs. Miller, Warner, Crossland, Hartzell and Hill.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Mr. Hill to confirm the action of November 25, 1910, approving plans for the improvement of the public water supply of Coshocton, prepared by Mr. L. E. Chapin, consulting engineer, and submitted by the superintendent of water works, Mr. A. M. Fisher, October 21, 1910, with the understanding that this approval shall be void unless construction is begun before January 1, 1912; and also calling attention to, the necessity of designing the man-holes, which are located over the wells, in such manner as to prevent the direct passage of river water into the supply.

Those voting in the affirmative were Messrs. Miller, Warner, Crossland, Hartzell and Hill.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Dr. Warner to confirm the Board's action of November 26, 1910, approving the plans for a proposed water supply for the village of Hudson, submitted by Mr. D. M. Hosford of Cleveland, consulting engineer, on October 26, 1910, with the understanding that this approval shall become void unless construction shall have been begun before January 1, 1912.

Those voting in the affirmative were Messrs. Miller, Warner, Crossland, Hartzell and Hill.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Dr. Crossland to confirm the Board's action of November 26, 1910, approving plans for proposed sewerage and sewage purification for the village of Hudson, submitted October 26, 1910, by Mr. D. M. Hosford, consulting engineer, provided:

1st. That samples of all filtering material be submitted to and receive the approval of the chief engineer of the State Board of Health before being placed;

2d. That a detailed plan of the automatic controlling devices be submitted to and receive the approval of the State Board of Health before such apparatus is installed; and,

3d. That this approval be valid only until January 1, 1912.

Those voting in the affirmative were Messrs. Miller, Warner, Crossland, Hartzell and Hill.

In the negative, none.

The Secretary was instructed to advise the engineer that the automatic siphons which control the discharge of the contact filters should be made of such size that the said discharge will occupy at least fifteen minutes in order to avoid flooding the sand filters; and, further, that the concrete walls surrounding the sand filters be built so that the tops of the same will be one foot higher than the surface of the sand.

It was moved by Dr. Warner and seconded by Mr. Hill to confirm the Board's action of November 30, 1910, approving the plan for a sewerage system for East Youngstown, as shown on drawing submitted by Mr. George M. Montgomery, consulting engineer, on November 9th, and as described in the information blank to accompany said drawing, received November 22, 1910, provided:

1st. That plans for a sewage purification plant be prepared and submitted to the State Board of Health for approval whenever the city of Youngstown, or the village of Struthers, submits such plans; and further that construction of a sewage purification plant of a design satisfactory to the State Board of Health, either independently or jointly with Youngstown or Struthers, be begun whenever the above mentioned municipalities begin construction of such plants; and

2d. That this approval be void after January 1, 1913, unless construction of the sewers is begun before that date.

Those voting in the affirmative were Messrs. Miller, Warner, Crossland, Hartzell and Hill.

In the negative, none.

The Secretary was instructed to advise the engineer that only in case of there being regularly used sanitary fixtures connected to the cellar drain should such drain be connected to the domestic sewers.

It was moved by Mr. Hill and seconded by Dr. Warner to confirm the Board's action of December 3, 1910, approving the plans for a new sewage purification plant for the Colony Farm owned by the city of Cleveland and located at Warrensville, submitted by Mr. Robert Hoffmann, chief engineer, department of public service of Cleveland, on November 14, 1910, provided:

1st. That samples of the filtering material be submitted to and receive the approval of the engineering department of the State Board of Health before being placed;

2d. That details of the automatic apparatus for distribution on to the filters, be submitted to and receive the approval of the State Board of Health before being installed; and

3d. That this approval be void after January 1, 1912, unless construction is begun before that date.

Those voting in the affirmative were Messrs. Miller, Warner, Crossland, Hartzell and Hill.

In the negative, none.

It was moved by Mr. Hill and seconded by Mr. Hartzell to confirm the Board's action of December 7, 1910, disapproving the use of the two ponds proposed for an additional source of water supply for Carrollton, unless the valve controlling the admission of water from this source to the pumping station be locked and the key kept in the possession of the health officer with the understanding that the water will be admitted only in case of emergency and that whenever this is done the public will be warned by the health officer to boil the water.

Those voting in the affirmative were Messrs. Miller, Warner, Crossland, Hartzell and Hill.

In the negative, none.

The Secretary was instructed to advise the local authorities that this action is taken with the understanding that immediate steps are to be taken to secure a sufficient and pure water supply from wells, after which the ponds are to be permanently cut off.

It was moved by Mr. Hill and seconded by Dr. Crossland to confirm the Board's action of December 7, 1910, approving the use of the natural gravel which is found on the site of the Louisville sewage purification works for filtering material, the lower $3\frac{1}{2}$ feet of the filters to consist of the unscreened material and the upper $1\frac{1}{2}$ feet of screened sand, in compliance with Condition 2 of the approval of the original plans April 22, 1909.

Those voting in the affirmative were Messrs. Miller, Warner, Crossland, Hartzell and Hill.

In the negative, none.

A list of health officers, appointed by council to serve in lieu of a board of health, who had been approved by mail was presented, and the actions approving same confirmed.

It was moved by Mr. Hill and seconded by Dr. Crossland to confirm the Board's action of November 28, 1910, granting a license to Mrs. Wm. Rosenfeld, to conduct a maternity boarding house and lying-in hospital at 4014 Muriel Avenue, Cleveland.

Those voting in the affirmative were Messrs. Miller, Warner, Crossland, Hartzell and Hill.

In the negative, none.

The Board then adjourned.

Attest :

C. O. PROBST,

Secretary.

DECEMBER SPECIAL MEETING

1910

A special meeting of the State Board of Health was held at the office of the Secretary, in Columbus, at 7:30 P. M. December 28, 1910.

There were present Drs. Miller, Crossland, and Warner, and Messrs. Hill and Hartzell.

The Board took up for consideration the complaint of the Board of Health of Lima, Allen County, Ohio, that the village of Ada, Hardin County, Ohio, is discharging and permitting to be discharged sewage and other wastes into the Ottawa River and by reason thereof is polluting the source of the public water supply of the city of Lima, which is derived from said stream. Having before it the report of the committee heretofore appointed by this Board to investigate the complaint, the same was on motion of Dr. Warner, seconded by Dr. Crossland, ordered read.

The report was then read.

It was then moved by Dr. Warner and seconded by Dr. Crossland that the Board finds from the report of its committee and other evidence, that the village of Ada by the discharge of sewage into Ottawa River and Grass Run, one of the tributaries thereto, is polluting the source of water supply of the city of Lima.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Crossland, Warner, Hill and Hartzell. Nays, none.

Thereupon it was moved by Dr. Warner and seconded by Dr. Crossland that the Secretary of this Board notify the authorities of Ada, Hardin County, of the Board's findings and that the Board has fixed Wednesday, the twenty-fifth day of January, 1911, at 8 P. M. in the office of the Secretary in Columbus, as the time and place, when and where the village of Ada, by its officers, or others, may have an opportunity to be heard and to show cause, if any, why the village should not take immediate steps towards purifying the sewage of that village.

The roll call upon the adoption of this motion resulted in Yeas, Messrs. Miller, Crossland, Warner, Hill and Hartzell. Nays, none.

The Secretary presented a letter from the health officer of Zanesville, in regard to permitting one of the physicians of Zanesville to pursue some studies along bacteriological lines in the laboratory of the Board. The letter was presented to determine the policy of the Board in regard to the matter.

After some discussion, it was moved by Mr. Hill and duly seconded

to deny the request as calculated to interfere with the regular laboratory work.

The Secretary stated that some requests had been received for laboratory release work in cases quarantined for diphtheria. He suggested that the laboratory would be capable of doing considerably more of this work if thought desirable and that it was the custom in nearly all large cities to release cases of diphtheria on two negative cultures.

The matter was discussed but no action taken.

Dr. Warner, as committee to consider the question of a health exhibit, submitted the following report, and moved that acute poliomyelitis be included among the diseases to be reported by physicians to local health authorities and that cases of such disease be quarantined:

REPORT OF THE EDUCATIONAL COMMITTEE.

To the Ohio State Board of Health:

GENTLEMEN:—

By your direction I recently visited New York City for the purpose of looking over the education exhibit in the American Museum of Natural History which is in the course of preparation, with a view to our establishing an educational exhibit along similar lines.

My belief is that after having looked over this exhibit thoroughly that the Board should have such an exhibit, and my recommendation is that the Board direct the Secretary to gradually prepare an educational exhibit as fast as he may be able to do so with the employees which we now have, it being assumed that perhaps there would be times when he could make use of the employees in that way; later perhaps as the preparation of the exhibit proceeds to employ outside labor for its completion, this, however, not to be done at the present time.

While at New York I also visited the Rockefeller Institute for Medical Research, and observed their work along the lines of infectious diseases, and it is my belief that following the plan there adopted we should place poliomyelitis upon the list of contagious diseases which should be required to be reported to the Board.

Very respectfully submitted,

FRANK WARNER,

Committee.

Columbus, Ohio, December 28, 1910.

The motion was seconded by Mr. Hartzell and carried.

The committee, of which Dr. Warner was chairman, appointed to report upon a budget for 1911 and 1912 and upon the readjustment of the working staff, submitted the following:

REPORT OF THE COMMITTEE ON STAFF AND BUDGET.

COLUMBUS, OHIO, December 28, 1910.

To the State Board of Health, Columbus, Ohio.

GENTLEMEN:—

At the meeting of the Board at the Hollenden Hotel, Cleveland, December 7th, 1910, a committee was appointed to consider the subjects of Staff and Budget,

and submit its report and recommendation to the Board at its next meeting in Columbus, December 28, 1910.

The committee has the honor to report as follows:

The attitude of state, city and National Government at the present time, is to economize in the cost of operation and maintenance and curtail expenses when it can be done without impairing the public service, but any considerable outlay beyond the necessities of the service, constitutes a waste of public money and as this is nearly all raised by some form of taxation, it is desirable as contributors to the general fund as well as alert men of affairs that the Staff and Budget of the State Board of Health be so adjusted as to represent the maximum of utility and efficiency to the State at the minimum of cost.

It is possible to obtain a high efficiency of the staff and a satisfactory performance of the duties required of the Board by a careful adjustment of the staff and assignment of duties to its members.

Excepting the secretary, whose profession is one of mercy, and who might at any time be called upon to exercise his skill to save a life or mitigate suffering, the members of the staff in the opinion of the committee should give their time exclusively to the State and not engage in any business or occupation, or accept any call or commission outside the duties of their respective offices. The Scriptural adage that "No man can serve two masters," was true two thousand years ago, and is true today and every employee should be required to give his undivided attention to the duties required of him by the Board.

The conduct of analytical investigations by the Board along a line of broad application like the "Reduction of Garbage" in large, built up communities, in our judgment should not be conducted by and at the expense of the State, but should be the subject of diligent, broad and careful investigation by the National Government, to the end that the results of such investigation may be available to every city in the country; in the same manner as investigations are now being conducted by the National Government, on the causes of coal mine disasters and explosions; and economy in the use of the natural fuel resources of the country.

The members of the Board stand in the same relation to the conduct of its affairs as do the directors of a commercial corporation, and it is their duty to keep in touch with the work and policies of the Board, especially in the application and use of its funds, in such manner that all transactions not strictly of routine character, may be passed upon by the Board at its regular monthly meetings, and to facilitate this end, it is thought wise to have the secretary prepare for consideration at the monthly meetings a requisition sheet showing the anticipated expenditures for the month, and excepting salaries and fixed expenses; have the same previously presented to the Finance Committee who must have it approved by the Board before the expenditures are incurred. Concerning the traveling expenses of members of the staff and members of the Board serving on committees which require them to travel, it is not possible perhaps to include these items in a monthly requisition sheet, but by requiring all members of the Board and staff to make up and forward to the secretary their expense accounts at the end of each month, or the nearest date to the end of the month, the same can be included in the statement of expenditures for the previous month and be submitted to the Board at its regular monthly meeting. At present it is doubtful if any member of the Board excepting the Finance Committee has any knowledge of the condition of the Board's fund from time to time.

Any unusual expenditures which must be incurred between meetings of the Board and which are not included in the requisition for the month, should be approved in writing by the President and Finance Committee and be reported in the list of expenditures submitted at the next regular meeting of the Board.

SECRETARY'S OFFICE.

Considering the secretary's office it is believed that the following employees can be dispensed with without impairing the service:

Dr. H. M. Platter, Inspector of Maternity Hospitals.

Mr. E. T. Williamson, Clerk.

Mr. H. R. White, Messenger and Shipping Clerk.

Experience shows that there are only seven cities in the State which have maternity hospitals, and as a rule the licenses to conduct them are renewed from time to time as they expire, and the applications for licenses by new institutions, are so few and widely separated in time, that the duty of inquiring into these and certifying them to the Board for action, can be temporarily performed by the secretary whom we recommend the Board designate for such duty, and when it becomes necessary to appoint special inspectors on account of epidemics of infectious and contagious diseases, it will cost the State less to pay such men a per diem and expenses than to maintain the office now filled by Dr. Platter.

The duty of Mr. Williamson, clerk, is mailing bulletins, reports and miscellaneous circulars; as this work does not require constant daily attention, it seems to the committee, this could readily be performed by the stenographers or some of the other employees of the office.

The duties of Mr. White are those of messenger and shipping clerk, and while the salary paid is not large, it seems to the committee that this official could be dispensed with, without injury to the public service. In transferring a clerk, Leo F. Ey, from the Laboratory to the secretary's office, he can perform Mr. White's duties and such other work as the secretary may direct.

ENGINEERING STAFF.

At the present time a part of the work of the engineering staff, is devoted to investigation of methods for the disposal of garbage and other domestic wastes, and a part to the compilation of statistics of the water works of the state, in addition to the routine duties imposed upon the staff by the necessary investigations of the proposed sources of water supply; purification of known polluted sources of water supply; causes of stream pollution and their influence on existing or prospective sources of water supply; sewage collection and disposal, and analogous work naturally devolving upon the staff in the sanitary interests of the State.

The investigation of methods for garbage reduction is a National and not a State problem; and upon proper presentation of the matter to the President and Department of Agriculture, there is no doubt in the mind of the committee that it will be promptly taken up as a study by the government, at the cost of and for the benefit of all the people, and with results of which the State can avail itself of, at its small pro rata of expense, while it is desirable to collate and report in permanent form the result of such analytical investigations as have been made to date, the maintenance of any special assistants for this purpose does not seem necessary and the services of Mr. Flower, chemist, can be dispensed with January 1, 1911.

Such clerical assistance as is now engaged on this work under Mr. Flower's immediate supervision can at the same time be dispensed with.

A part of the work of the engineering staff as stated in the compilation of the statistics of the water works of the cities and towns of the state, but this will seldom if at all, require visits by members of the staff, and by confining the inquiries along this line to the strictly sanitary conditions of water works, it is believed that the necessary work can conveniently be forwarded during lulls in the routine work of the staff.

By confining the work of the engineering staff strictly to the sanitary work required by the Board, it is thought that of the remaining five assistants to the chief engineer, one can be dropped from the roll, and that with systematic and well directed effort and diligence in responding to the directions of the Board and its executive, the necessary work can be performed by the chief engineer, dropping Mr. Flower, Mr. Van Buskirk, Miss Cohen, Miss Sullivan, the office boy and any extra laborers, retaining Miss Halderman and Miss Smith.

CHEMICAL STAFF.

In view of the other official and professional connections which the chief of the laboratories now has, it is obvious that the work required of him by the State cannot have his undivided thought and attention, and that the real work of analysis and routine investigations are performed by the other men in this department, it is believed no interference with the routine work of the laboratory would be occasioned if Mr. Rickards' services were dispensed with, and Mr. Parker, the assistant, placed in charge of the laboratory at his present salary of \$1,480 per annum, and required to conduct the work under the direction of the secretary and executive officer.

A careful consideration of the work of the laboratory suggests that the services of Miss Huffman can be dispensed with and Miss Dwight transferred from the secretary's office to the chemical laboratory to assume Miss Huffman's duties and that by a readjustment of the duties of the remaining members of the staff, the services of Scholz need not be continued after January 1, 1911, and Leo F. Ey transferred to the secretary's office.

SPECIAL INSPECTORS.

With a view to economy in the emergency expenses of the Board, it is recommended that the compensation of special inspectors of contagious and infectious diseases be made hereafter, the same as that of members of the Board while attending meetings or in the performance of other duties which may from time to time be assigned to them, viz., at the rate of five dollars (\$5.00) per day, and that the extra help now employed in the several departments be dispensed with January 1, 1911, and that extra help, additional assistants or members of the staff be not hereafter employed except upon action of the Board at a regular or special meeting, after having been first acted upon by the Executive Committee, it being recommended that the Staff and Budget Committee become a standing executive committee.

LETTER BALLOTS.

It is also thought that some expense can be avoided by omitting the present letter ballots and submitting at the regular or special meetings, all engineering problems to be first submitted to a standing engineering committee of one.

MONTHLY BULLETIN.

In the opinion of the committee the usefulness of the Board will be enlarged by sending out as do the State Boards of Health of Virginia and Illinois, monthly bulletins of current editorial and abstracted matter of interest to health officers, physicians and municipal officers connected with sanitary works.

The present quarterly bulletin issued by this Board while admirably conducted, comes too seldom to make the impression on the people of the State, which should be made by literature of this nature.

A monthly bulletin need not be large, but it should bristle with the latest

information on current health and sanitary topics and might be so adjusted in size and form as to bind in and constitute a part of the regular annual report required by law.

BUDGET.

Considering the budget, it is thought that this can be reduced by the saving of salaries effected by the adoption of the recommendations and suggestions submitted herein, excepting the increased per diem and traveling expenses of the members of the Board in attending regular monthly meetings, and an allowance for the cost of apparatus and other means of disseminating useful and desirable sanitary information among the people of the State, especially among health officers and health boards, and the officers of municipalities and townships connected with health measures.

The changes and apportionments of the budget, can be made to conform to the recommendations contained in this report prior to the time when by law it must be handed in to the General Assembly, when the committee will submit it in detail at the January meeting. This committee should be continued to report at that meeting.

ROOMS FOR THE ENGINEERS.

We recommend that rooms 908, 909, 912 and 914 in the Harrison Building be retained, unless equally satisfactory and cheap quarters can be secured elsewhere, and that rooms 915, 916 and 1110 be released. That desk room for ex-employees not be permitted.

In submitting this report the committee desires to state that it believes it has acted in conformity with the wishes of the people of the State as expressed at the polls last November, which were to the effect that the State Government should be conducted upon a business basis, at the least cost consistent with a proper administration of the public service, to the end that tax burdens may be reduced, and that the same diligence and care in the conduct of the affairs of a private business or corporation shall prevail in the conduct of the affairs of the State, as far as it lies within the power of this Board so to do.

Respectfully submitted,

FRANK WARNER,

JOHN W. HILL,

Committee on Staff and Budget.

It was moved by Dr. Warner and seconded by Mr. Hill that the report be adopted, and that the committee be continued, to submit a supplementary report on budget at the next meeting in January.

This motion was carried.

The Chair appointed Dr. Warner and Mr. Hill as the Executive Committee, and Mr. Hill as the Engineering Committee.

The question of appointing a plumbing inspector was discussed and the committee continued, to report at the January meeting.

There being no further business, the Board adjourned.

Attest:

C. O. PROBST, *Secretary.*

RESUMÉ OF REPORTS PRESENTED TO THE BOARD BY THE SECRETARY

JANUARY MEETING.

(The part of this report referring to work done in 1909 was published in the 1909 Annual Report.)

INFECTIOUS DISEASES.

Investigations of infectious diseases were made as follows:

January 7th, Dr. Heinlein visited Freeport, Harrison County, where the authorities wished advice relative to closing the schools, two children having been taken sick in school with scarlet fever. The inspector advised closing the schools for two weeks and thorough fumigation.

January 14th, the superintendent of the Norfolk and Western Railway telegraphed that a case of smallpox had broken out among their workmen in Franklin Township, Ross County, and that the health authorities refused to quarantine. Dr. Dick was sent there, and traced the exposure to Omega. The car was placarded and the trustees of the township agreed to take care of the matter. All the men had been vaccinated.

January 15th, upon request of the physician in charge at the Girls' Industrial Home, Dr. Platter visited the institution to investigate an outbreak of eruptive disease prevailing there which had been diagnosed pemphigus simplex. At the time of his visit there were fourteen cases in the hospital. On account of paucity of lesions in the opinion of the inspector the disease was not pemphigus nor impetigo, but rather a pus infection. Examination of cultures in our laboratory showed the presence of staphylococcus in pure culture. It was recommended that a parasiticide be used in the treatment and that infected clothing be immersed in a solution of bi-chloride, and a systematic effort be made to locate every case in the institution.

WATER SUPPLIES AND SEWERAGE.

Wilmington was visited relative to a proposed water supply, and the existing supply at Carthage, Ironton and West Milton was inspected.

Youngstown was visited to inspect proposed sewerage and sewage purification for The Realty Trust Company's property, and the sewerage and sewage purification plant under construction at Elmwood Place was inspected by one of the engineers.

The following places were visited, by one of the engineers for the purposes mentioned: Cleveland, Columbus, Cincinnati and Dayton in

connection with the study of city wastes disposal; Sunbury relative to the disposal of creamery wastes; and Pleasant Hill and Xenia to inquire into nuisances complained of.

Union City was visited to investigate the complaint under the Bense Act, that the sewage and wastes from the J. A. Long Co.'s plant is polluting certain ditches.

APRIL MEETING.

INFECTIOUS DISEASES.

The last of January Dr. Dick visited Lima and found smallpox was prevailing there, with fifteen known cases in the smallpox hospital and the possibility of other cases which were not reported or quarantined. The attention of the board of health was called to the law requiring prompt report of all cases of smallpox to the State Board. A set of rules and regulations was formulated and sent to the authorities for the control of the outbreak, and Dr. Platter was sent to Lima to learn what was being done. He met the board of health, the council and board of education, to assist in establishing efficient quarantine measures. The outbreak was soon brought under control, though isolated cases have appeared from time to time.

Cases of smallpox have continued to appear among the employes engaged in construction work on the Norfolk and Western Railroad between Columbus and Portsmouth.

The trustees of Pickaway Township, Pickaway County, have agreed to pay the expenses incurred by the State Board of Health in suppressing the outbreak of smallpox which occurred in that township during December, 1909, and January, 1910.

There have been an unusual number of cases of the disease in Portage and Van Wert counties, though at present the disease is well under control.

Dr. Dick investigated outbreaks of smallpox at Lockbourne on February 1st, Belleville, March 14, and Big Island Township, Marion County, April 16th. In the latter case he found a man in the ninth day of eruption. Twenty or more persons had been exposed and no vaccination or steps taken toward looking up the exposed persons.

March 7th, Dr. Hole visited Wooster, where he found a person just recovered from smallpox nursing a patient having chickenpox.

February 17th, Dr. Dick visited Johnstown to confirm the diagnosis of scarlet fever. He saw seven families where cases had occurred, one case having evidence of the disease. In the other cases no eruption was present. He gave needed advice in regard to quarantine and disinfection.

March 25th, Dr. Platter investigated an outbreak of typhoid fever

at Derwent, a mining town of 500 inhabitants on Wills Creek, about ten miles from Cambridge, and has submitted a detailed report.

April 1st, the Secretary made an address before the forty-fifth meeting of the Michigan Schoolmasters' Club at Ann Arbor, and April 5th, he attended a public meeting of the Anti-Tuberculosis Society of Canton, where plans for a county sanatorium for tuberculosis were discussed.

The National Association for the Study and Prevention of Tuberculosis proposes that a sermon or talk on tuberculosis be heard in the churches throughout the United States on April 24th. Co-operating in this, the outline for such a sermon, prepared by the Association, has been sent to the health officer of each city and village in the State, requesting them to take the matter up with their local churches and stating that as many copies of this sermon would be furnished as desired. Furthermore, that the circulars of the Board on "The Prevention of Consumption" would be furnished in such quantities as they might request for distribution among the various congregations. Up to this time about 104,000 copies of our circular have been sent out.

The following letter was sent to Attorney-General Denman, April 11, 1910:

"This Board has been asked for assistance by the board of health of a small village in the state as regards the following situation:

"There is a glove and shirt factory in this village that employs some seventy or more girls and women, and six or eight men. The man who does the cutting for this factory has consumption, having had the disease for a year or more, and every piece of goods that is handled by these girls and women first passes through his hands. The man expectorates in various places about the factory, and has a severe cough, so that there is undoubtedly opportunity for infection. The girls recently called a meeting, at which the manager and clerk of the board of health were present, and they asked that this man be discharged. The manager said, so I am informed, that he realized that there was some danger, but that he was fearful that if the man was turned off on account of his disease the company might be held liable for damages.

"I realize that a general order prohibiting consumptives from working in shops and factories would entail in many cases an unjustifiable hardship, but there are undoubtedly many cases where conditions are such as to greatly endanger fellow workmen which should be dealt with by law, if this is permissible.

"I wish therefore to know whether a local board of health would have authority to make a special order in a case such as I have related which would prohibit the man referred to from continuing to work in this factory."

The opinion rendered is as follows:

"COLUMBUS, OHIO, April 14th, 1910.

DR. C. O. PROBST, *Secretary State Board of Health, Columbus, Ohio.*

DEAR SIR:—I acknowledge receipt of your inquiry in which you state that, "There is a glove and shirt factory in a village of this state, that employs some seventy or more girls and women, and six or eight men. The man who does the cutting for this factory has consumption, having had the disease for a year or more, and every piece of goods

that is handled by these girls and women first passes through his hands. The man expectorates in various places about the factory, and has a severe cough, so that there is undoubtedly opportunity for infection."

You then inquire if the local board of health has authority to make an order which would prohibit the man referred to from continuing to work in this factory.

In reply thereto I beg to say that this question so vitally important, is not without its perplexities. The principle involved herein is one so far reaching in its effect that I have given it the most careful consideration. The health of the community is of paramount importance, and if the law of the state will justify the making of such an order as this local board evidently desires to make, it is clearly my duty to so advise. The state of Ohio is rapidly coming to a full appreciation of the insidious spread of, and casualty caused by consumption. This fact is evidenced by the legislature appropriating large sums of money for the establishment and maintenance at Mt. Vernon, Ohio, of a tuberculosis sanatorium for the treatment of those in the incipient stages of the disease.

It is admitted by our best medical authorities that in the association with a person in an advanced stage of tuberculosis, this disease is infectious to a marked degree. It is the duty of local boards of health to guard the public at the source of the trouble.

In my opinion the legislature has so conferred this power on boards of health in the enactment of section 4413 of the General Code, as follows:

"The board of health of a municipality may make such orders and regulations as it deems necessary for its own government, for the public health, the prevention or restriction of disease, and the prevention, abatement or suppression of nuisance, etc."

Every girl and man referred to in your inquiry is in the greatest danger of being infected with tuberculosis from this consumptive cutter, and through them the families from which they come and the public. Therefore, an order of the local board of health prohibiting a person having consumption in the advanced stage from working under such circumstances as are described in your inquiry comes within the law as effecting the "prevention or restriction of disease."

"The care of the public health, it has been held, is an important object, and laws conferring powers upon the agencies for its preservation should receive a liberal construction in order to effect an advancement of the ends and an accomplishment of the purposes for which they established."

Abbott on Municipal Corporations Sec. 120.

Blue v. Beach 115 Ind. 121.

I reach the conclusion that the board of health of a municipality within this state has ample authority to make an order that will prohibit the man complained of in your inquiry from working under the circumstances therein described, and which will apply with equal force to all similar circumstances within the jurisdiction of the board making such order. I am impressed with the fact that the enforcement of an order of this character may, in certain instances, work a seeming hardship as against the person amenable thereto, and therefore the order should be invoked and applied with the greatest judgment and discretion; but the protection of the "public health" is the first consideration, and the legislature has expressly provided agencies for such protection, even though it might

mean the transposing of a person from a position of self support to that of a public charge.

Yours very truly,

(Signed) U. G. DENMAN,
Attorney General.

April 6, 1910, at the request of the local authorities, Mr. Hartzell investigated the Stark County Jail at Canton.

PROPOSITIONS UNDER THE BENSE ACT.

April 8th, the committee consisting of Mr. Hartzell and the acting chief engineer visited East Liverpool to make an investigation of a complaint, under the Bense Act, relative to the public water supply.

April 9th, the acting chief engineer investigated the complaint, under the Bense Act, relative to the public water supply of Bellaire.

April 14th the committee, consisting of Dr. Warner and the acting chief engineer, visited Marble Cliff to investigate the complaint made under the Bense Act.

The acting chief engineer also visited Union City to investigate the complaint against the J. A. Long Company.

Reports upon these investigations are ready for presentation.

Dr. Platter had made inspections of maternity boarding houses in Cincinnati, Columbus, Lima, Sandusky and Toledo.

In connection with the study of city wastes disposal the following cities were visited: Cleveland, Cincinnati, Dayton, Columbus and Zanesville.

PUBLIC WATER SUPPLIES.

The acting chief engineer visited Akron relative to a change in their water supply; Andover and Hudson relative to proposed new supplies, and Youngstown in regard to an additional water supply.

Amherst, Bradford, Carthage, Mechanicsburg, Painesville and Shreve were visited by one of the engineers relative to a new or additional supply.

The board of trustees of public affairs of Vermilion wrote that complaints were being made of their public water supply. The acting chief engineer made an examination of the purification plant and reported that on the whole the present operator of the plant was obtaining fairly satisfactory results. The plant has some defects and the authorities were advised, as soon as funds will permit, to install a new and very much larger coagulating basin, plans for which must be approved by this Board.

Reports have been made on the water supply of Columbiana, Kent, Madisonville, Middletown, St. Bernard and Bond Hill, Salem, Shreve, Troy and West Milton.

The water at Columbiana was found to be of good quality from a sanitary point of view, though somewhat hard and objectionable for

boiler use. A copy of the report was sent to the mayor and council, with advice in regard to keeping records and the condemnation of certain private wells found to be polluted and unsafe. Their attention was also called to the great need of an adequate sanitary sewer system, plans for which have already been approved by this Board.

The water supply of Kent was found to be of exceptionally good quality from a sanitary standpoint. Some iron causing discoloration of the water drawn near dead ends may cause complaints but this may be remedied by blowing off fire hydrants near dead ends. The authorities were also advised that the water from Plumb Creek is contaminated and should not be used except in extreme emergency, such as a great conflagration. The village was found to be very lacking in sewerage facilities, giving rise to unsanitary conditions and council was urged to again bring the matter to the attention of the people with a view of building a system similar to that already approved by the Board, incorporating purification works.

In the investigation of the water supply of Madisonville it was learned that in October, 1909, an additional well had been put down, 50 feet from the old wells, without the Board's approval, and that all the wells are remotely subject to contamination from a large negro settlement in the valley of Duck Creek. The authorities were advised that the Board would not approve this supply but as they had been to considerable expense installing the machinery etcetera, we would make occasional examinations of the supply and should analysis reveal that it is receiving a dangerous amount of contamination, the local authorities will be expected to at once seek a new source in a locality where the soil is not subject to contamination.

The investigation of the water supply of St. Bernard and Bond Hill revealed the fact that a second well had been drilled in the yard of the pumping station in 1908, without the Board's approval, about 60 feet from the first well. The quality of the water of the second well was not equal to that of well No. 1, and a leaky casing was found, which might allow pollution to enter the well. A copy of the report was furnished the authorities, they were advised to keep the casing of well No. 2 in good repair, and that examinations would be made of the water from time to time to see that it did not deteriorate.

It was found that the well at Shreve yielded a supply not entirely satisfactory at times, the water derived from strata near the surface showed evidence of contamination, while that from the deep seated strata was very good. The authorities were advised to recase the well to a depth of at least 125 feet and have it so fitted that the elimination of ground water would be insured. The greater bulk of the water is derived from strata probably below 140 feet. The authorities were also advised in regard to removing surface contamination, remodeling privies, and the prohibition of the use of abandoned wells as receptacles for sewage,

etc., and that when these recommendations had been carried out another inspection would be made and if all danger had not been eliminated a new supply should be sought.

The water supply of Troy was examined in order to follow up certain indications of contamination discovered by one of our engineers in 1907, at which time a report was made to the authorities and advice given relative to removing all sources of contamination. Conditions were found to be about the same and although the supply of ground water must have been much greater than in 1907 and the corresponding dilution of contaminating influences much more marked, the presence of nitrates, chlorine and bacteria remain high enough to indicate that the water pumped from the wells is receiving some contamination, and a greater degree of contamination would likely occur during dry seasons with scarcity of ground water. The attention of the authorities was also called to the possibility of contamination from the Miami County Fair Grounds, though this is not great as the water passes through so great a distance of gravelly material; to an element of danger from surface drainage, which could be eliminated by changing the course of a ditch; to the removal or reconstruction of privies in the vicinity of the water supply; and that future wells should be sunk in a new location, removed from habitation.

The Trotwood Water Company wrote that certain parties were contemplating constructing a slaughter house within 150 feet of the water works pumping station. The council of Trotwood was advised that this would be a menace to the quality of the water supply and that steps should be taken to prevent the location of a slaughter house at this site.

SEWERAGE AND SEWAGE PURIFICATION.

The acting chief engineer made visits to the following places relative to proposed sewerage or sewage purification: Alliance, Akron, Andover, Bellefontaine, Cincinnati, Canton, Hudson, Jackson, Louisville, Milford, Pleasant Ridge, Sebring and Youngstown (The Realty Trust Company).

At Canton the present plant is entirely inadequate and it is the intention to improve the old plant. Canton was visited in company with the consulting engineer, upon request.

The acting chief engineer also held conferences with the consulting engineers in charge of the work at Carthage, Elmwood Place, Greenville, Jefferson, Louisville, Niles, Sebring and Warrensville.

Amherst, Carthage and Forest were visited by one of the engineers relative to sewerage and sewage purification.

The acting chief engineer inspected the sewage purification plants at Lockland, Wyoming, and the plants at Mt. Gilead, and Wapakoneta were visited by one of the engineers.

At Wapakoneta it was found that the authorities had constructed a

combined sewer, with full knowledge of the law, the plans for which were disapproved by this Board in 1902.

During a recent inspection of the Eaton sewerage system it was learned that an excessive quantity of ground water still exists, 450,000 gallons in twenty-four hours, or nearly four times as much as had been noticed on previous inspections. The plant was designed to treat 100,000 gallons of sewage, and the village engineer was notified that unless effective measures were taken at an early date to cut down this excessive flow of ground water it would be necessary for the Board to require a considerable extension of the existing plant, at great expense to the village. It is believed that most of the ground water that finds its way into the sewers is confined to one locality and that it can be dealt with by reconstructing the sewers, using special methods. They were advised to make weir measurements in a number of manholes to locate the entrance of the ground water under various conditions, and that these measurements should extend over a considerable period of time with a view of observing varying conditions.

The acting chief engineer inspected the sewage disposal plant under construction at the O. S. and S. O. Home near Xenia. Some defects in construction were noted. A report was made and sent to the superintendent of the Home, calling attention to conditions needing immediate attention, and a copy sent to the engineers.

One of the engineers visited Salem and found that the city, for financial reasons, failed to build a sewage purification plant at the time of installing additional sewers, a requirement in the conditions of approval of the Board in 1906. A gross nuisance in small streams receiving the untreated sewage has resulted. From the report of the engineer it appeared advisable for the Board to not attempt to force the installation of the plant until the nuisance created is made the basis of complaint under the Bense Act. The mayor and council were, however, advised that steps should be taken for the construction of sewage purification works without delay.

At the request of the village solicitor, the acting chief engineer visited Westerville and found, as on previous investigations, that the sewage purification plant was giving very poor results, partly due to poor construction, and also to the village not appointing a superintendent of sewers. The plant should be reconstructed.

Upon request, the acting chief engineer made a report, stating as fully and accurately as possible facts connected with the disposal of sewage at Oberlin, to be used in a suit brought against the village by a number of farmers owning property bordering on Plumb Creek at points below Oberlin. Copies were furnished the village solicitor and the attorneys in the case.

Upon request of the consulting engineer, the acting chief engineer visited Andover for the purpose of examining on the ground the loca-

tion of wells for a proposed water supply and the best location and type of sewage purification plant for the village.

One of the engineers visited North Amherst to inspect the sewage purification plant of the Ohio Quarries Company, built to serve a small community about the works. The plant was giving very unsatisfactory results, due primarily to the lack of proper attention. The plant is quite small and the company was advised that they should at once detail an intelligent laborer to devote at least an hour in the morning and one in the afternoon of each day to keeping the plant in good condition.

NUISANCES.

The prosecuting attorney of Greene County requested an investigation of an alleged nuisance arising from the rendering plant of the Xenia Fertilizer Company. The owners of the plant joined in the request, desiring to learn of any possible means of reducing the odors arising from the process. One of the engineers visited the plant January 6th and after thorough investigation, made a report embodying suggestions for improving conditions at the plant. A copy of the report was furnished those requesting the investigation.

The board of health of Pleasant Hill asked for advice relative to the construction of cesspools, vaults and small sewage purification plants for individual buildings. One of the engineers visited the village January 12th and a copy of his report was furnished to the board of health. The investigation disclosed that in the absence of a sewerage system, the only means of protecting the private water supplies against contamination would be the prohibition of the use of vaults and cesspools which allow the sewage to seep into the surrounding soil, and the requirement of the construction of water-tight receptacles.

March 21st while in the neighborhood of White Cottage, a small village on Jonathan Creek in Newton Township, Muskingum County, the acting chief engineer was asked to investigate a nuisance created by stagnant water in an abandoned stone quarry, at times giving rise to disagreeable odors and forming a breeding place for great numbers of mosquitoes, to the discomfort of all living in its vicinity. The possibilities of this stagnant water as a source of malaria were evident, and the health authorities were advised that it would be a comparatively simple and inexpensive matter to fill the quarry with loose soil, an abundance of which is found in the vicinity thereof, and that they should give the matter attention.

April 13th, the acting chief engineer investigated a complain in Lexington Township, Stark County, and found a decided nuisance due to bad odors in the vicinity of a rendering establishment. He reported that the only effective way of getting rid of the nuisance would be the shutting down of the plant; though the odors might be materially minimized

by remodeling the plant so that it would conform to best modern practice and by maintaining the plant in a scrupulously clean condition.

April 14th one of the engineers investigated a nuisance at Spencer-ville, arising from the operation of a rendering plant, and also the contamination of Six Mile Creek by wastes from slaughter houses, the rendering plant and a hoop works. A report, with recommendations was furnished the local authorities, who have ample power to deal with nuisances of this nature.

Numerous complaints have been received from residents of Terrace Park, Tower Hill and people having summer camps and cottages along the Little Miami River, protesting against the pollution of the river by the sewage of Milford. The acting chief engineer made an investigation April 5th and a report is to be presented at this meeting.

JUNE MEETING.

INFECTIOUS DISEASES.

At the request of the local authorities medical inspectors have been sent to the following places on account of smallpox: New Jasper, Jasper Township, Greene County; Bremen, Wilmington, Sebring, Harrod, Allen County; Kensington, Hanover Township, Columbiana County, Logan and Ravenna.

At Wilmington the disease was not recognized for some time which resulted in a large number of exposures. It became necessary to make a second investigation at this place, and to call a meeting of the public authorities to advise with them as to more active measures for the suppression of the disease.

The same thing was also true of Logan, where some twenty-three cases occurred before the disease was finally recognized as smallpox and any action taken to suppress it.

The inspector who visited Sebring found that their first case had been a man who was operated on for appendicitis at Alliance and was sent from there to Sebring.

While no investigation has been required at Cleveland, reports have been made to this Board of a rather serious outbreak of smallpox which has occurred in that city, mostly among unvaccinated Poles. The cases have been of a more severe type than usual and 53 cases and 8 deaths have been reported. It was at first thought that the outbreak was due to direct importation from Europe, which might account for its being of severer type than the disease prevailing elsewhere in the United States. The health officer reports, however, that he is unable to verify this. One district physician, and two medical students who visited the detention hospital, contracted the disease.

SCARLET FEVER AND GERMAN MEASLES.

A wide spread eruptive disease prevailed for a considerable period in the counties of Wayne, Ashland, Richland, Medina and Huron. This Board was finally appealed to to send an inspector to make an investigation. Unfortunately when he arrived but few of the cases in active stage could be seen, and in most of the places visited it was impossible to determine with certainty what had been the nature of the outbreak. Apparently they had been having both scarlet fever and German measles, and mumps was also epidemic at the same time in some communities. A detailed report will be made.

TYPHOID FEVER.

The health officer of Canal Dover, a few days ago, reported twelve cases of typhoid fever and asked for assistance in determining the cause. Dr. Platter was sent there but has not yet completed his investigation. He found, however, that 34 cases had occurred in eleven days. Milk is suspected, but a preliminary examination of the dairy revealed no opportunity for milk infection. The investigation is being continued.

TUBERCULOSIS.

Tuberculosis Sunday, April 24th, alluded to in the last quarterly report, judging from the large number of newspaper clippings received, was quite generally observed.

The Attorney General has rendered an important opinion in regard to tuberculosis hospitals, to the effect that county commissioners proposing to erect a county hospital have authority to purchase new lands, not necessarily adjoining lands now used for infirmary purposes, upon which to build a county tuberculosis hospital. A copy of this opinion has been sent to all of the county commissioners.

The Secretary has attended meetings with commissioners at Wooster and at Elyria in regard to establishing tuberculosis hospitals and has had several such conferences at the Columbus office with other commissioners in reference to the same matter.

NEW WATER SUPPLIES.

The board has been called upon to make investigations in reference to new or additional water supplies in the following places: Cambridge, Cadiz, Carthage, Canal Fulton, Fort Ancient, Lakeside, New Lexington, Painesville and Waverly. As a full report will be made to the Board upon these supplies when they have been officially adopted by their respective communities and require the Board's approval, nothing further need be said in regard to them at this time with one exception.

The investigation at Lakeside showed matters to be in rather an

unsatisfactory condition as regards their water supply. Their sand filtration plant was practically out of commission. It is doubtful whether it is effecting any purification of the lake water. The management proposes for the present to secure water for domestic purposes from a series of deep wells and to continue the use of lake water for flushing and sprinkling purposes; warning the users, however, not to use the lake water for drinking or cooking. The use of wells even if cased to a depth of 40 feet, as advised by our engineer, may prove to be dangerous on account of the geological formation at Lakeside. Those in authority state that the wells are to be looked upon as a temporary expedient and that they hoped to be able next season to put in a proper filtration plant. I believe the Board, if it has authority, should take some drastic action in regard to this place, and compel the authorities to provide proper sanitary conditions for visitors.

EXISTING WATER SUPPLIES.

The existing supplies at Batavia, Collinwood, Kelleys Island, Lakeside, Sandusky, Springfield and Pleasant Hill are reported upon.

It will be remembered that the Board approved a water supply for the village of Apple Creek, Wayne County, to be obtained from a spring, upon the condition that certain precautions were to be taken by the authorities to make the pollution of this spring impossible. An examination of the new supply was made by the engineering department and it was found that these conditions had not been complied with, or at least not strictly. The attention of the authorities was called to this. They were reminded of what they had agreed to do in the matter and were informed that another investigation would be made in the near future to learn what action had been taken.

SEWERAGE AND SEWAGE PURIFICATION.

In connection with sewerage and sewage purification works, investigations have been made at Akron, Alliance, Ashland, College Hill, Coshocton, Girls' Industrial Home at Delaware, Elmwood Place, Eaton, Hartwell, Middletown, Minister, Plain City, Sandusky, Cleveland Boys' Farm at Warrensville, Wilberforce, O. S. and S. O. Home at Xenia, Wyoming and Zanesville.

Seventy towns were visited by the Board's representatives and 123 visits were made during the quarter.

PROPOSITIONS UNDER THE BENSE ACT.

Summons to appear at this meeting for a hearing were sent to The Victor Stamping Works, at Twightwee; The J. A. Long Company at Union City; and to the authorities at Bellaire, Ironton, East Liverpool and Marble Cliff.

The authorities at Marble Cliff have waived this privilege and will proceed at once to construct a sewerage system and disposal plant in accordance with plans approved by this Board.

East Liverpool, in compliance with the request of the Board, has appointed three consulting engineers to investigate and report upon their problem.

Fostoria. The plans for remodeling the sewage purification plant at Fostoria were submitted by Mr. Charles Latshaw, who is sometimes employed as their city engineer. A review of these plans revealed that the alterations proposed would in no way offer an adequate solution of the problem. Our engineer visited Fostoria on May 25th and had a consultation with Mr. Latshaw and the director of public service. Tentative recommendations were made for remodeling the present plant, but it was suggested that certain information should be furnished us for further suggestions before completed plans are presented.

Greenville. The Attorney General informs me that he has filed a demurrer in the Greenville case. The decision on the demurrer if unfavorable will raise the question of the constitutionality of the Bense Act. He has asked the judge who will hear the case for the earliest hearing possible but does not know when that will be.

LOCAL BOARDS OF HEALTH.

An opinion rendered by the Attorney General in regard to local boards of health is of great interest. He holds, under the General Code as adopted by the last legislature, that it will no longer be possible for councils of cities to turn over the health department to the board of public service, or rather the director of public service as it would be now under the new provisions for municipal government, and where the director is now so serving it will be necessary to organize a board of health.

A copy of this opinion has been sent to the mayor and council of each city where such an arrangement was in effect. This change in the law should have the effect of removing local boards of health farther from political interference.

NUISANCES.

Upon request of the clerk of Bethel Township, Clark County, one of the engineers visited New Carlisle May 5th to investigate an alleged nuisance, caused by the operation of The New Carlisle Reduction Company. The report showed that the plant is located and operated in such manner that it does not create a serious nuisance due to odors arising from the process; but from the standpoint of the creation of a nuisance, the method of disposal of the tank liquors by feeding to swine should be stopped. A copy of the report was furnished the State Dairy and Food Commissioner for such action as he might wish to take in the matter.

June 21st, one of the engineers investigated a nuisance at Leon, Ashtabula County, created by the discharge of wastes into Mill Creek from the creamery of The Ohio and Pittsburg Milk Company. The Company was advised to install a purification plant for the disposal of their wastes, and was furnished a copy of our Quarterly Bulletin containing report on "Disposal of Creamery Wastes."

June 22nd, one of the engineers investigated a nuisance complained of in regard to the pollution of an open ditch in the village of Solon, Cuyahoga County, caused by the termination of a sewer receiving wastes from a milk depot and two closets into the ditch. The local authorities were furnished a copy of the report and were advised that they should order the owners of the milk depot and of the two residences discharging wastes into the sewer to provide cesspools for the disposal of their wastes and remove their connections to the sewer; and that the ditch should then be cleaned, straightened and no further nuisance should result.

NITRATE OF SILVER OUTFITS.

The question of outfits for furnishing physicians with a solution of nitrate of silver in the prevention of blindness has received considerable attention. The best and cheapest outfit seems to be the one used in the state of New York, consisting of a dropper with rounded edges to prevent injury to the eye, and a small amber colored vial to contain the solution. These will cost a little less than two cents each. Explanatory circulars are being prepared to accompany this outfit which will be sent out, we hope, within the next two or three weeks.

BUREAU OF PUBLICITY.

The following letters open up a matter which I have had in mind some time and that is, the question of what might be termed a Bureau of Publicity in connection with the Board's work. It was hoped that the last legislature would make an appropriation for a traveling tuberculosis exhibit, and I had in mind that after one or two years of this work we would try to convert this into a traveling health exhibit of some other character.

Last year the Board had for its appropriation outside of salaries, \$16,512.96. The amount available this year, that is for the year ending February 15th, 1911, outside of salaries is \$20,001.11. While our engineering and laboratory work is increasing and will demand larger expenditures, we shall still have, probably, some funds for publicity purposes if this should be deemed feasible and expedient. The letters are as follows:

"OBERLIN, OHIO, June 14th, 1910.

"MR. C. O. PROBST, Secy. State Board of Health, Columbus, Ohio.

"DEAR SIR:—At the suggestion of Prof. F. F. Jewett of this place I write you, to broach a plan occurring to my mind that I think your Board would find

of great interest and advantage to take up. Details would have to be elaborated, but the main idea follows:

"Some two weeks ago the Oberlin board of health had Prof. Jewett deliver a lecture on 'House Flies' which was illustrated by a moving picture film rented from a Cleveland firm. The lecture was free, the board of health paying the bills, and the house was crowded and great interest aroused against this unhealthful pest.

"For a number of years I was engaged in illustrated lecture work and this occasion suggested to me a method whereby your State Board can educate the public in this direction, viz.: Secure one or more competent men to travel throughout the state, in both town and country communities, delivering lectures on the House Fly and general hygiene, illustrated by stereopticon slides and moving picture films.

"Such slides and films would have to be prepared especially, as the film I saw was not sufficiently complete, and no slides were shown. These could easily be secured in great abundance, for photographs innumerable could be secured of existing disease breeding conditions in stables, back-yards, rear of business blocks, etc., in any village.

"Should this plan commend itself to you I shall be pleased to correspond further as to details, with the expectation of being your first field representative.

"Would tentatively suggest that local boards of health be asked to pay five to ten dollars per lecture towards expenses and voluntary contributions collected from the audiences for the balance, any surplus to go to your board for use in other or similar directions.

"You are at perfect liberty to inquire from Prof. Jewett concerning my character and qualifications, who has known me for years, and I trust this suggestion will result in some such action as outlined.

"As you see, I am at present a special agent of the U. S. Census Bureau, but expect to be at liberty after July 1st, or thereabouts.

"An early reply will be appreciated.

Yours truly,

(Dr.) J. W. HOLTON, 30 E. Lorain St.

"COLUMBUS, OHIO, March 28th, 1910.

"State Board of Health, City:

"GENTLEMEN:—We are attaching proof of an article sent out in plate form for the Pennsylvania Department of Health. It seems to us that a campaign along this line in Ohio would prove mighty valuable to the public in general.

"The writer shall be glad to talk this matter over with you if you are interested, making a price for the plates that should be an inducement to give the service a trial.

"We would like to hear from you regarding this matter.

"Very truly yours,

AMERICAN PRESS ASSOCIATION,

ALBERT BERNET, *Manager*.

JULY MEETING.

INFECTIOUS DISEASES.

There has been no unusual number of cases of smallpox in any one district.

At the request of the local authorities medical inspectors have been sent to Irondale, Leetonia, New Concord and Springfield.

The case at Leetonia was traceable to an Alliance case.

When our medical inspector arrived in Springfield the case, a young girl of fourteen, had gone to London. He immediately went to London where he found her quarantined, but diagnosed the case chickenpox.

TYPHOID FEVER.

At the request of the Columbus and Hocking Clay and Brick Manufacturing Company, Dr. Platter was sent to Green Township, Hocking County, on July 19th, to investigate an outbreak of typhoid fever at Kachelmacher. He found five cases in the village, three of contact origin. Samples of water from three wells were collected and are being examined in our laboratory. A detailed report will be made.

Attention was called to cases of typhoid fever occurring at the Girls' Industrial Home at Delaware, and Dr. Platter was sent to the Institution July 16th to make an investigation. He found that eight cases of the disease had occurred since March 24th and one suspicious case. A detailed report will be made.

July 14th, at the request of the board of commissioners of Columbiana, Portage, Stark and Summit counties, the Secretary visited Akron to inspect three sites proposed for a District Tuberculosis Hospital.

Conferences were also held with the State Fire Marshal, Mr. John W. Zuber, and the State Inspector of Workshops and Factories, Mr. Thomas P. Kearns, relative to a sanitary building code to be adopted by the three departments, to be submitted to the next General Assembly.

July 20th, Mr. Hill and the Secretary met the President of the State Board of Public Works in regard to flushing Mill Creek with the wastage from the canal.

July 25th, upon the request of the mayor, Mr. Hansen addressed a public meeting at Lodi on the sewer questions now before that village.

NEW WATER SUPPLIES.

The Board has been called upon to make investigations in regard to new or additional water supplies in the following places: Canal Fulton, Carthage, Dunkirk, East Liverpool, Fremont, Fort Ancient (the grounds for the encampment of a division of the Ohio National Guard), Lakeside, Minster, New Concord and Waverly.

Dr. Warner visited Lakeside July 9th and 10th, and made an investigation of their water supply. The Lakeside Association has constructed two wells on different parts of the grounds and were drilling a third. They propose to construct a number of wells, sufficient to furnish drinking water everywhere over the grounds and to use the present lake

supply for cooking and other household purposes and for sprinkling lawns. His report states that there does not seem to be crevices in this stone as at Put-in-Bay but that it seems to be uniformly solid throughout. It was recommended that the water of these wells be submitted to frequent chemical and bacteriological analysis.

EXISTING WATER SUPPLIES.

Existing water supplies at Carthage, Cedar Point, Girard, Piedmont and Put-in-Bay have been reported upon.

The inspection of the water purification plant at Cedar Point revealed that the conditions of approval have been satisfactorily complied with for the most part. No definite provision has been made towards the equipment and maintenance of a laboratory, as required in Condition 5. Suitable room is available and a laboratory will be equipped if on further consideration the State Board of Health deems the same absolutely essential to the proper operation of the plant.

The examination of the water supply at Piedmont showed it to be of good quality.

The water supply of Put-in-Bay has been installed. All the hotels in which the water works mains are accessible have been connected with the exception of the Hotel Commodore, formerly the Beebe House. The water rates are to be assessed on the flat rate basis, and the manager of this hotel refuses for this reason to connect with the system. The assessment would be approximately \$150.00 for the season, which he thinks is too high. Unless satisfactory arrangements are made, this hotel will continue to use its old intake.

The report upon the recently completed water works at Girard indicates that the supply is of satisfactory quality from a sanitary standpoint, though it contains a large quantity of mineral matter and a considerable quantity of iron.

One of the Board's conditions of approval, "That an iron removal plant, satisfactory to the State Board of Health, be installed before the water is delivered to consumers", has not been complied with. It was pointed out to the company that the complaint and difficulty resulting from the use of an iron impregnated water would render the installation of an iron removal plant a good business proposition, and the company replied that they would send a representative to Columbus soon for a conference in regard to the matter.

SEWERAGE AND SEWAGE PURIFICATION.

In connection with sewerage and sewage purification works investigations have been made at Akron, Covington, Conneaut, Defiance, Girard, Hubbard, Lorain (private sewer), Mt. Gilead, Ottawa, Steubenville, Toledo, Youngstown (The Realty Trust Company's Addition) and the O. S. and S. O. Home at Xenia.

One of the engineers inspected the experimental treatment plant at Alliance.

The sewage purification plant at the Toledo State Hospital was inspected, and conferences were held with engineers in Toledo relative to sewage purification for Bellefontaine, the Country Club at Findlay and Bryan.

The sewage disposal plant for the O. S. and S. O. Home has not been accepted. Several visits to the plant were made by the engineering department and a number of communications were sent to the authorities at the Home and to the construction engineers, warning them that the work was not being properly done in accordance with plans that had been approved.

The disposal plant at Mt. Gilead, and also the one at Plain City were found to be giving rather poor results, due partly to defective operation and partly to failure to carry out certain changes in construction that had been recommended by the Board. The attention of the proper authorities was called to these matters.

PROPOSITIONS UNDER THE BENSE ACT.

One of the engineers visited Collinwood to see what was being done towards complying with the order of the State Board of Health, namely, that such connecting sewers be built as are necessary to convey the entire sewage flow to the outfall of the Cleveland interceptor and that necessary steps be taken to prevent contamination of Rockefeller Creek in other ways than by the discharge of the village sewage, on or before August 1st, 1910. He was informed by the city engineer of Cleveland that funds are about to be made available for the completion of work necessary to comply with the Board's order.

One of the engineers visited Delphos to investigate the operation of the copperas recovery plant installed at the Delphos Manufacturing Company's works, and also the pollution of Jennings Creek and the Auglaize River.

He found that the requirement of this Board relative to the purification of the acid iron wastes from the above named plant has been complied with. The plant, however, fails to take care of certain muriatic acid iron wastes used in the galvanizing process, which wastes continue to flow into the village sewers, and it remains to be seen whether the continued discharge of such wastes into the sewers will interfere with the proper operation of the sedimentation tank now provided for sewage treatment and whether all nuisance in the creek will be abated. Another inspection will therefore be made on or before August 1st, 1910.

Resolutions passed by the board of health and the council of Wilmington, May 9th, 1910, were received, asking this Board to investigate sewerage conditions in that city with a view of requiring the city to introduce a sewerage system under the provisions of the Bense Act. The

matter was referred to the Attorney General who recently advised that nothing be done in the case until the Greenville case had been decided in the courts.

It will be remembered that the J. A. Long Company at Union City, Ohio, who operate a butter and cheese factory at that place and against whom a Bense complaint had been made, was ordered to appear before the Board at its June meeting to show cause why they should not be required to take proper measures to abate the nuisance not later than January 1st, 1911, or remove the plant to some other location where their business may be conducted without public offense.

The following telegram was received at Cleveland after the Board had adjourned.

"Quit making butter. Will not make any until we get outlet. Council Indiana side put our case till next morning." Signed, J. A. Long Company.

It is the desire of the company to make an arrangement whereby they may conduct their wastes to a sewer now being built on the Indiana side of this town.

A complaint was received from the authorities of Paris Township, Union County, that the sewage of Marysville is polluting Mill Creek, and a committee consisting of Dr. Warner and the chief engineer has been appointed to make the necessary investigation and report.

No action was taken by the Board in regard to the complaint concerning the water supply of Bellaire following the hearing before the last meeting. Some disposition should be made of the matter at this meeting.

At the last meeting of the Board, following the reading of Mr. Hill's report on the Mill Creek situation, the Secretary was instructed to notify the villages of Carthage and Elmwood Place that purification of the sewage from their villages would not be required at this time. Attention is called to the fact that Hartwell has an incompleeted sewage plant and it may be deemed advisable to include this village in the above mentioned action.

At the last meeting the Board adopted an order requiring purification of or a change in the public water supply of Akron and also an order requiring The Victor Stamping Company to present plans by August 10th, 1910, for the purification of their industrial and other wastes. These orders were prepared but have not been executed owing to the absence of the Governor.

It would be proper to extend the time in regard to The Victor Stamping Company.

NUISANCES.

July 5th and 6th, one of the engineers visited Reading to investigate a complaint and found the small ditch which passes through the central part of the village badly polluted by sewage from Notre Dame Convent and by wastes from houses along its banks, thereby causing considerable annoyance, especially in dry weather, to persons living near. The local authorities were advised that they had the power and should take steps at once to abate this nuisance.

July 15th, one of the engineers investigated a nuisance caused by the wastes from a slaughter house of The Flushing Provision and Ice Company in Belmont County. He found, in addition to the pollution of the stream, that the tankage and solid matter were not being properly disposed of. With the technical advice given and intimate knowledge of the business the problem of the pollution of the stream should be easily solved, with proper care in operating the plant. The local health authorities were notified that they had ample power to abate this nuisance.

Several complaints were received regarding the bad condition of closets and other unsanitary conditions at Buckeye Lake Park, and on July 20th, Mr. H. R. Elrick of the township board of health asked the Board's assistance in dealing with some of the conditions found.

July 22nd, Dr. Platter visited this resort and made an inspection. He reported that the closets at the Park, 20 in number, are flushed automatically every four minutes, and that the management is making an effort to keep them in sanitary condition.

The remedy for conditions at this resort would be the installation of a sewage disposal plant, but for the present, if the State Board of Public Works were to open the gates at the head of a run receiving the drainage from the park and cottages, it could perhaps flush out the run and improve conditions.

Forty-eight investigations have been made by the Board's representatives and forty-five different places visited.

OCTOBER MEETING.

INFECTIOUS DISEASES.

The health officer of New Vienna reported that three children had broken out with an eruption while in school and asked that an inspector be sent to diagnose these cases. Dr. C. F. Hegner, of Cincinnati, was sent there and pronounced the disease chickenpox. He advised the examination of all school children and the isolation and quarantine of those found with an eruption.

At the request of the local authorities Dr. A. J. Heinlein was asked to investigate an outbreak of diphtheria in Bridgeport and the adjoining township of Pease, and to look after the cases. These cases are in a small mining town.

TYPHOID FEVER.

Dr. Platter's investigation of typhoid fever at Canal Dover revealed that 28 of the first 30 cases were users of milk from one dairy. Analyses of the water from the dairy showed it to be of good quality. It was concluded that the milk supply furnished the means of dissemination of the disease, and that in all probability this supply was contaminated on one day only either on the route or by the presence of a carrier at the dairy who assisted in the care of the milk on but one occasion and who was not present at the time of the investigation. Sixty cases have occurred. A detailed report has been made.

August 15th, the health officer of Dennison reported the presence of typhoid in Dennison and Uhrichsville. August 19th, Dr. Platter made an investigation and found 19 cases in Dennison and 7 in Uhrichsville. Over one-third of the Dennison cases were traceable to contact. A detailed report has been made.

August 25th, the health officer of Lockbourne reported typhoid fever and asked for an investigation. Dr. Platter visited the village the following day. He found that the first case was imported. A detailed report has been made.

October 6th, Dr. Platter investigated an outbreak of typhoid in Tymochte Township, Wyandot County. He found that since July there had been in McCutchenville, an unincorporated village, and the surrounding township, twenty cases. The investigation showed that the first two cases in McCutchenville originated in the family of a hotel keeper and the family of a restaurant keeper. Other members of both families later developed mild febrile attacks with bowel trouble and were probably cases of typhoid. A detailed report has been made.

NEW WATER SUPPLIES.

The Board has been called upon to make investigations in regard to new or additional water supplies in the following places: Alliance, Bedford, Carrollton, Chardon, Dunkirk, Garrettsville, Lakeside, Leesburg, Lisbon, Mansfield, Mechanicsburg, Murray City, Newark, Springfield, Sylvania, Upper Sandusky, (Court House), Utica, Waverly, West Lafayette and Wooster.

The investigation of the proposed improvement of the water supply for Fremont included the consideration of what is known as Green Spring, about 7 miles southwest of the city, which had been suggested as a possible source. The present supply is taken from the Sandusky River. This water contains a considerable amount of sulphur and a rough esti-

mate by the engineering department, based upon present available information, was that the cost of conveying water from this spring to Fremont would be somewhere in the neighborhood of \$150,000, not including damages, water rights, etc., whereas the cost of a filtration plant would probably not exceed one-third of this amount.

At the request of the Adjutant General an investigation was made of the water supply available at Ft. Ancient for the use of the Guard during their encampment. One test well had been put down and the water proved to be of excellent sanitary quality and gave evidence that a sufficient quantity could be obtained in that neighborhood. In addition some 51 wells were visited on the maneuver territory, covering approximately 10 square miles. Chemical and bacterial samples were obtained from 23 of these wells, which seemed from their surroundings most liable to contamination. Of this number 17 wells were considered unsafe and the remainder as under suspicion. The conclusions of the report made to the Adjutant General were as follows:

"It is apparent from the above that in view of the dangerous quality of 17 of the wells, the susceptibility to infection of the remaining 34 and the uncertainty of an adequate supply, the territory in the vicinity of Ft. Ancient is unfavorable from the standpoint of the suitability of private wells for use by the soldiers. In order to insure the avoiding of such wells as are unsatisfactory, those wells marked dangerous should be placarded."

Request was made by the authorities of Garrettsville for an investigation of a proposed additional source of public water supply for the village. It was proposed to obtain this from a small creek flowing near the pumping station. Investigation showed many opportunities for pollution of this creek and chemical and bacterial examinations showed the water to be of poor quality. The authorities were advised not to make use of this supply.

The following communication in reference to the water supply of Lakeside was sent to the secretary of the Lakeside Camp Meeting Association, August 9th, 1910:

"At the time of the last meeting of the Board, July 27th, 1910, the analysis of samples collected from proposed new well at Lakeside had not been completed. Since then, however, the completed analysis has shown the presence of bacillus coli. One of the samples was taken from a deep well near the pumping station; the other from a shallower drilled well near the center of the park.

"In view of the presence of coli in these samples, it would seem to be dangerous to approve these wells without a very extended series of analysis and after repeated sampling had shown in all cases the absence of coli.

"As the level of the water in the new well can be materially and quickly lowered by hand pumping, it is apparent that many new wells would be necessary to obtain sufficient water for all purposes.

"It is believed, therefore, that the wisest and in the end the cheapest method of securing a permanent water supply for Lakeside would be to install a filtration plant of approved design."

WATER WORKS UNDER CONSTRUCTION.

The villages of Bradford and Elmore, where water works are under construction, were visited by a member of the engineering staff.

It was learned that the water works at Bradford were being constructed in accordance with plans and the conditions of approval.

At Elmore it was found that two conditions of approval so far have not been complied with, namely, the filling of abandoned wells in the vicinity of the water works well with concrete and the connecting of all houses in the vicinity of the water works with the public sewerage system. Notice of these omissions were sent to the authorities.

EXISTING WATER SUPPLIES.

Investigation and report has been made by the engineers on the water supply or purification plant at the following places: Apple Creek, Batavia, Bellefontaine, Camp Perry, Chicago Junction, Findlay, Fort Recovery, Girard, Huron, Loveland, Massillon, Mt. Vernon Sanatorium, Pleasant Hill, Put-in-Bay, Sycamore, Vermilion, Warren, Washington C. H., and West Milton.

Brief mention may be made of points of special interest.

At Batavia it was found that the water purification plant was giving rather poor results, *B. coli* being found in 10 c. c. portions of both filtered and unfiltered water. The superintendent of water works was instructed in regard to certain changes in the operation of the plant that seemed desirable.

At Girard, examination showed a decided decrease in the amount of iron found in former samples following the installation of an airlift. It is possible that a deferrization plant may not be required as formerly recommended. Further examination of this supply will be made later.

Investigation of the water supply at the Ohio State Sanatorium at Mt. Vernon showed evidence of some pollution. A broken vitrified sewer leading from the laundry is probably accountable for this. The attention of the Sanatorium authorities was brought to this and an iron pipe will take the place of the vitrified pipe and make pollution from this source impossible.

At the last meeting it was reported that an investigation of the new water supply at Put-in-Bay had shown that the water was in general use except at the old Beebe House, now known as the Hotel Commodore. An investigation made since that time shows that all the hotels to which the new supply is accessible are now making use of it. The authorities were urged to extend the system so that all private supplies may be done away with.

On account of some cases of typhoid fever at Warren an examination of the water purification plant for that city was made. The examination showed that the plant is being operated quite satisfactorily and producing a water of good quality.

The same conditions, the presence of some twenty cases of typhoid fever during the month of August in Washington C. H., led to the examination of their public water supply. The examination, with analyses, indicated that the water is of satisfactory quality from a sanitary standpoint and was not responsible for the outbreak of typhoid.

PROPOSED SEWERAGE.

Bellefontaine, Findlay (Country Club), Kenton, Lindsey, Mason (School House), Toledo (Copland Heights), Warrensville and East Youngstown have been visited relative to proposed sewerage.

EXISTING SEWERAGE AND SEWAGE PURIFICATION.

One of the engineers inspected the plants at Delaware (Girls' Industrial Home), Dennison, Camp Perry, Madison, Mt. Vernon (State Sanatorium), New Bremen, Mt. Gilead, Norwalk, Oxford, Toledo, Urbana and Westerville.

An inspection of the construction of a sewer at Covington showed that they had failed to install manholes at all changes of grade and direction, as required by the plans. The authorities were notified that they would be expected to place manholes in accordance with plan.

An inspection of the sewage purification plant at the Home for Ohio Soldiers, Sailors, etc., at Madison showed that the plant was working very unsatisfactorily owing to neglect in keeping it in proper condition. The attention of the authorities was called to necessary changes in the method of operation.

SEWAGE PURIFICATION WORKS UNDER CONSTRUCTION.

Purification works under construction were inspected at Alliance, Jefferson, Louisville, Sebring, Sylvania, Wilberforce University and the O. S. and S. O. Home at Xenia.

The plant at Wilberforce University has been completed and is in operation. It was found that the sand surfaces of the filters were not level, that the distributing troughs for sewage were not properly constructed or placed and that from lack of a ditch earth was being washed from an adjacent hill on to the surface of the filters. Attention of the authorities was called to these points.

At the last meeting it was reported that the sewage disposal plant at the O. S. and S. O. Home at Xenia had not been properly constructed so far as the work had gone and that the work had therefore been temporarily stopped. The contractor had become financially involved and his contract with the institution reverted to his bondsmen, the United States Surety Company. The trustees agreed to proceed with the construction work using such money as remained in the fund set aside for the improvement and the company agreed, in case the available funds failed to

complete the work according to the contract, to furnish funds to the extent of \$1,500 to finish the plant.

A report was sent to the superintendent of the institution stating that in order to satisfactorily complete the plant it would be necessary to entirely reconstruct Filter No. 1, and also make various other repairs and replacements of the old construction work as outlined in the report.

PROPOSITIONS UNDER THE BENNE ACT.

Complaint under this act has been made in regard to the sewage of Salem polluting a creek passing through the city. This has been referred to a committee consisting of Mr. Hartzell and the chief engineer for investigation.

The Board has also been asked to investigate the public water supply of Plymouth which it is alleged is impure and dangerous to health of consumers, and Mr. Pratt was appointed a committee to make this investigation.

NUISANCES.

Investigation on account of a nuisance has been made at Bowling Green, Byesville, Grandview Heights, Greenville, New Bremen, South Euclid, Tiffin, Toledo, Twinsburg and Youngstown (Idora Park).

At Bowling Green the nuisance consists of the pollution of an abandoned stone quarry which from failure to pay taxes has reverted to the State. The only feasible method of abating the nuisance would be by filling the quarry, at an estimated cost of about \$3000. As the property belongs to the State an opinion has been asked from the Attorney General as to how this nuisance can be abated.

Upon request, July 28th, the chief engineer investigated the pollution of Mill Creek at Sandusky, caused by wastes from a brewery and wine factory, and which has been the cause of complaints for many years. The nuisance existing within the corporation, the local authorities were advised that they should have no difficulty in enforcing an order to abate the nuisance, and should consult their city solicitor as to the method of procedure to be followed.

August 2nd, upon request of the mayor, one of the engineers investigated a nuisance at New Bremen, caused by the discharge of the village sewers and creamery wastes into a township ditch. A report was furnished the mayor, and he was advised to secure from the Board of Public Works permission to draw 3,000,000 gallons of water from the canal to dilute the flow through the ditch; and to order the creamery company to install a plant to purify its wastes.

One of the engineers went to Youngstown August 3rd to investigate the unsanitary condition of Idora Park, a pleasure resort owned by the electric railway company. He found that the sewage purification, which had been installed without the approval of this Board, was en-

tirely inadequate to purify sewage, especially as the effluent passed into Mill Creek only four miles above the water works intake of Youngstown. The attention of the company was called to this and they were informed that they would be expected to have prepared and submitted to the Board, plans for remodeling and enlarging the plant so it would properly perform the work required of it. (Later the company arranged to connect with the sewerage system of Youngstown,)

Upon request, a nuisance at Tiffin was investigated, August 10th, and found to be caused by the discharge into Gibson Run of liquid wastes from a creamery. The board of health was advised how to abate the nuisance; and attention was called to the plant at Sunbury which is successfully purifying the wastes from the creamery there.

At Grandview Heights, which is a suburb of Columbus, it appears that the nuisance can only be abated by the construction of sewers and sewage purification, or by discharging such sewerage system into the city sewers if permission so to do can be obtained from the city of Columbus.

The nuisance at South Euclid was found to be due to the improper operation of the sewage disposal plant at Rainbow Cottage, a charitable institution for sick and deformed children. Instructions for properly operating the plant were given and it was also suggested that the tanks and filters should be covered.

The South Side Citizens League of Toledo sent a request to the individual members of the Board to attend the meeting of that league in Toledo and inspect the condition of Swan Creek complained of as a nuisance. The President appointed Mr. Hill and the chief engineer as a committee to attend this meeting, which they did on September 8th.

Later a resolution from the city council was received, asking this Board to make an investigation of the condition of Swan Creek. After consulting with the Attorney General I informed the clerk of the council that any action taken by the Board in regard to Swan Creek would have to be under the so-called Bense Act and that it would be necessary for them to make their petition in the prescribed form. A copy of this form was sent to the clerk with the statement that the matter would be given prompt attention as soon as the proper petition was received. Nothing further has been heard in regard to Swan Creek.

Complaint was also made to the Board in regard to the pollution of Ten Mile Creek in Toledo, and a report on the condition of this creek was made by one of the engineering assistants on August 8th. Those making the complaint were furnished with a copy of the Bense Act and the necessary form to be used in making their petition. Nothing further has been heard from those making this complaint. It was found that a serious nuisance exists both as regards the pollution of Swan Creek and Ten Mile Creek, which can probably only be abated by the entire re-

construction of the sewerage system of the city of Toledo, or by the installation of local sewage purification plants.

Since the last meeting 80 different places have been visited and 97 inspections made by some representative of the Board.

October 6th, samples of sand designated as Bay sand, Lake sand, and Coarse Lake sand, respectively, were approved by the engineer of the Board for use in the sewage plant under construction at the O. S. and S. O. Home at Xenia, submitted in accordance with Condition No. 1, of the Board's approval of August 23rd, 1909.

DECEMBER 28th MEETING.

INFECTIOUS DISEASES.

No inspections have been made on account of smallpox.

DIPHTHERIA.

November 12th, Dr. C. F. Hegner of Cincinnati, was sent to New Weston, Darke County, to investigate an outbreak of diphtheria. Having received negative reports from our laboratory, the health officer had hesitated to diagnose the cases diphtheria, and other physicians in the village had not reported their cases promptly.

With the health officer, Dr. Hegner visited eleven families in which there were fifty children. They found ten sick with diphtheria, seventeen convalescing, and two had died. These people were all opposed to the use of antitoxin, and one family having nine children, belonged to a so-called sanctified sect and were unwilling to have a physician prescribe for them.

Dr. Hegner advised a continuance of rigid quarantine until negative reports were received from specimens sent to our laboratory, and until the houses of all infected families had been fumigated. He also advised the closing of schools, churches and the prohibiting of public gatherings. One infected family lived outside of the village. A letter was sent to the health officer advising strict quarantine of all persons having diphtheria or suspected diphtheria and of those exposed to others having the disease. The epidemic was soon brought under control.

SCARLET FEVER.

November 16th, a telegram was received from a citizen of Norwalk, stating that scarlet fever was present in epidemic form and that proper quarantine was not being enforced.

Dr. Charles M. Hole of Cleveland was sent to Norwalk and reported that there had been thirty cases of scarlet fever and one of diphtheria, but no new cases had occurred for a week.

Dissatisfaction had arisen on account of the quarantining of one family and not that of a neighboring family where a boy of seven had been sick with sore throat and a high temperature. Dr. Hole visited this family with the attending physician and did not think the case in question was scarlet fever. Neither the boy nor his five-year-old sister (who had been indisposed some three weeks before) showed any evidence of desquamation. In the opinion of Dr. Hole the board of health had been careful and diligent in its management of the situation.

November 23rd, Dr. D. F. Banker of Canton was sent to Beach City where trouble had arisen over the failure to quarantine mild cases of scarlet fever.

TYPHOID FEVER.

Three outbreaks of typhoid fever were investigated and reports, with recommendations, furnished the authorities.

October 19th, in answer to a request for assistance from the local authorities, Dr. Platter was sent to Middlebury Township, Knox County, to investigate an outbreak of typhoid fever. In the unincorporated village of Waterford and vicinity he found there had been eight recognized cases, five of which were clearly of contact origin. All of these cases were being cared for by trained nurses and the discharges thoroughly disinfected. Analysis of the water from the town well showed it to be of good quality. Drilled wells are the rule and the privy is not located near the well as is the usual custom. A detailed report has been made.

November 16th and 17th, Dr. Platter visited Jackson and found that since July 15th there had been twenty-nine cases and four deaths from typhoid fever. These cases were confined, for the most part, to a territory of about three squares each way, a very low and swampy district subject to overflow each spring, when the wells become very foul. A detailed report has been made.

November 9th, upon request, Dr. Platter was sent to Washington Township, Warren County, to investigate an outbreak of typhoid fever in the vicinity of Ft. Ancient, credited to troops encamped there. Since the first of September there had been nine cases in three families and locally many attribute the outbreak to fly infection. Report had it that several cases of typhoid occurred among the soldiers during their encampment, but at the office of the Adjutant General it was stated that there had been very little illness of any description among the soldiers, and no typhoid. A detailed report has been made.

November 1st-5th, 1910, Drs. Warner and Probst attended the meeting of the American Association for Study and Prevention of Infant Mortality at Baltimore, Maryland.

November 9th-10th, Drs. Miller and Probst visited New York to investigate port quarantine in cases of cholera.

November 11th-14th, 1910, the chief engineer visited Albany and New York City to study the design and construction of a miniature sewage disposal plant, and charts, diagrams, etc., for a sanitary exhibit.

December 21st-24th, 1910, Dr. Warner visited New York for the purpose of looking over the educational exhibit in the American Museum of Natural History.

PROPOSITIONS UNDER THE BENSE ACT.

Recent investigations under the Bense Act have been made at Ada and Lima by Mr. Hill and the chief engineer; Bellaire and Delphos by one of the engineers, Plymouth by the chief engineer, Salem by Mr. Hartzell and the chief engineer, and Ironton by the chief engineer.

Under the provisions of this act the authorities of Ada, Lima, Marysville, Plymouth and Salem have been cited to appear before the Board at the January meeting.

The Board's orders, approved by the Governor and the Attorney General, have been issued to Bellaire, Bucyrus, Lima, and The Victor Stamping Company at Twightwee.

Greenville. The latter part of November the Common Pleas Court of Darke County upheld the constitutionality of the Bense Act; and the city solicitor of Greenville has now taken the case to the Circuit Court.

Bryan. A report was made by the engineering department upon a recent investigation of the plant of The Van Camp Packing Company at Bryan in connection with the proposed sewerage and sewage purification plant at Bryan and a copy of the report furnished the engineers, Messrs. Riggs and Sherman. The report showed that after careful measurements of the combined wastes from all apparatus in which milk is handled before canning, and analyses of the representative samples, have been made, more definite conclusions could be drawn, and that a sewer should be placed so as to carry off all pure water from the condensers and sterilizers directly to the ditch now used, and the strong wastes should be discharged from the plant so that a weir may be constructed for measurement and in order to facilitate sampling.

Delphos. An informal report was made by the engineering department upon a recent inspection of Jennings Creek with reference to the copperas recovery plant of The Delphos Manufacturing Company. It appears from this inspection that the creek is still polluted at times both by sewage from the village and by wastes from the manufacturing company's plant, and that there is just cause for complaint from those living along the creek below the village of Delphos. The authorities were notified that this Board will expect the village and the Delphos Manufacturing Company to take such steps without further delay as will remove this source of complaint. They replied that the pollution of the creek was now caused by the Delphos gas works.

Bellaire. One of the engineers visited Bellaire to ascertain what

steps had been taken by the city to comply with a notification from this Board in regard to the filtration of the public water supply. It appeared that action by the city officials in regard to completing and placing in operation the new water purification plant was being postponed until the order of the State Board of Health under the Bense Act had been received by them. This order was issued December 6th, 1910.

NEW WATER SUPPLIES.

The Board has been called upon to make investigations in regard to new or additional water supplies in the following places: Dunkirk, Hiram, Lisbon, Lowellville, New Paris, New Concord and Waverly.

The Dunkirk supply has been approved. The supply proposed for Lisbon and for Lowellville has been found by analyses to be satisfactory, but before action is taken upon the plans tests must be made to determine the quantity available.

Analysis of the water proposed as an additional source for Hiram showed it to be safe from a sanitary standpoint, but on account of the large amount of iron which it contains the village authorities were advised to consider installing means for removing the iron, or seek another source of supply.

The authorities of New Paris were advised to employ a competent consulting engineer to make a careful study of their water supply question.

The Waverly plans are to be considered at this meeting.

At New Concord a real estate company desires to furnish a suitable water supply for its new addition and ultimately to supply the village. Two sites have been investigated and the company has been furnished with reports upon these and advised that the site south of the B. and O. R. R. appears to be the best suited for the location of public supply wells, but before the matter can be acted upon by the Board a pumping test should be made to demonstrate that a sufficient quantity may be obtained, after which analyses must determine whether the quality is satisfactory, and the wells must be located where they can be protected against surface contamination.

Reports have been made upon proposed supplies for Chardon, Lisbon, Sylvania and West Lafayette, and a letter of advice with informal recommendations sent to the authorities, or engineers, in each case.

EXISTING WATER SUPPLIES.

An investigation has been made of the water supply or purification plant at Barnesville, Beach City, Bradley, Carrollton, Freeport, Fredericksburg, Johnstown, Hamilton, Lakeside, Mineral City, Shawnee, Troy, Wilmington, Willoughby and Woodfield.

At Hamilton the Board was asked to investigate tastes and odors

in the water arising from algal growths in the reservoir. A report was made to the superintendent of the water works and he was advised that the most permanent method of preventing the odors in the supply would be to cover the reservoir. This would require considerable time and expense. As a temporary remedy he was advised to clean the walls and floor of the reservoir by washing with a fairly strong solution of copper sulphate, wasting the wash water. He replied that they would do nothing before spring, when possibly they would clean and cement the reservoir.

The investigation of the supply at Woodfield was made on account of complaints received of the tastes and odors in the water, and the feasibility of improving the water with the use of copper sulphate. The report of the investigation clearly indicated that the only satisfactory solution of obtaining a proper water supply for Woodfield would be to install a filtration plant, which would remove not only the mud which is present at times in the water but also the tastes and odors, and would be a protection against possible dangerous pollution from persons who work or fish near or in the reservoir. The authorities were advised that in addition to a filtration plant the distribution reservoir should be covered, and all leaky water mains repaired. To this advice the company replied that they would not have the money to build a filtration plant, but might cover the reservoir, though they thought the city should assist them.

Reports have also been made on the existing supply at Delta, Fort Recovery, Loveland, Sycamore and Ravenna; and upon the progress of construction of the water works at Shreve.

The report on the Delta supply showed that the same had been installed in accordance with the plans approved by the Board and that the water works were being properly managed and operated. The quality is satisfactory from a sanitary standpoint, but is high in mineral content.

At Fort Recovery it was revealed that they had failed to comply with the conditions under which the water supply was approved in 1900, relating to precautions necessary to be taken to protect the well from contamination. Analyses showed that while the water is at present safe from a sanitary standpoint, it is very hard and contains an objectionable amount of turbidity. The health officer was advised that, in order to provide the village with a water satisfactory from all standpoints, the matter of removing the iron and softening the water should be taken up with council.

At Loveland it was found that owing to failure of the machinery they had been obliged to use raw water from the Little Miami River. Several times the authorities had been advised to install duplicate machinery and had this been done the use of the raw river water would not have been necessary. The well from which the supply is obtained and the emergency intake were installed without the approval of the

State Board of Health, although the water was found to be satisfactory and they were informally allowed to continue with its use.

The water company was advised that another inspection would be made in about a month and if at that time arrangements had not been made to adequately protect the public against the use of polluted river water, the Board would be obliged to take some action for the protection of the water users.

The examination and analyses showed the water at Sycamore to be safe from a health standpoint, although it contains an objectionable quantity of sulphur and iron and is quite hard. The authorities were urged to take steps to prevent any possible future pollution of the present pure supply by surrounding privies which should be water-tight, or placed above the ground in the vicinity of the wells.

The examination of the public water supply of Ravenna showed that the method of handling the supply is quite satisfactory. The source of this supply is Crystal Lake and Muzzy Lake and four drilled wells located near Crystal Lake. Analyses of the water showed a high organic content of vegetable origin. The total number of bacteria in the water was not high, though there were partial indications of sewage contamination in the samples collected from Crystal Lake and the distribution system. In view of the analytical results the authorities were advised to maintain a more strict surveillance of the watersheds of these lakes and to prohibit fishing in both lakes and cattle from getting into the water.

Examination of the water supply of Springfield revealed that extensive changes had been made in the method of obtaining the supply without the approval of this Board. Copies of a report of the examination were furnished the health officer and the water works superintendent, and certain recommendations made with a view to placing the supply in the best possible condition with the use of the development recently employed. We were advised that nothing has been done towards making these improvements on account of lack of funds. The authorities have been advised that it is highly desirable that these improvements be installed in the spring of 1911 and to this end steps should be taken at once to prepare and submit plans, specifications and estimates of cost for the work.

PROPOSED SEWERAGE.

Kennedy Heights, Ney and New Philadelphia were visited relative to proposed sewerage, and Canton in regard to proposed improvements in the sewage disposal plant.

The health officer of Cincinnati submitted the question of permitting The U. S. Bung Manufacturing Company at Cincinnati to turn the wastes from a wood pulp plant into Mill Creek, and the matter was referred to Mr. Hill for investigation. Mr. Hill reported from investiga-

tion he believed there would be no objection to this, at least so long as Mill Creek is not improved along the lines already suggested by him in his report to the Board on that subject, and that in case the stream is improved it is possible the waste water from the pulp works could be sedimented in order that no solid matter be carried into the stream. The company was advised that the Board would make no objections to such a plant provided it is understood that an order of the Board will be promptly complied with to sediment the waste water before it is delivered into the stream whenever the Board shall deem such an order necessary.

EXISTING SEWERAGE OR SEWAGE PURIFICATION.

One of the engineers inspected either the sewerage or sewage purification plant at College Hill, Chicago, Elyria, the Home at Madison, Mansfield, Mt. Vernon Sanatorium, Oberlin, Pomeroy, Xenia and Wapakoneta.

An informal report has been made on the sewage purification plant at Mt. Gilead which indicates that the plant has been built substantially in accordance with the approved plans and that several recommendations made to them had been carried out. The authorities were, however, advised in regard to protecting the filter bed by sodding and drainage and the reconstruction of the distributors, and were also advised that steps should be immediately taken to increase the filtering area.

The report upon the recently completed sewage purification plant at Sylvania showed that the plant had been installed essentially as designed and according to the conditions of approval. The authorities were advised to sod all banks around the filters in order to keep the earth and clay from washing onto the sand and clogging it and to construct a dike around the northwest end of the plant for the purpose of diverting the surface wash.

Upon recent inspection at Wapakoneta the Auglaize River was found to be in about the same condition as when last inspected. The dam constructed at the western edge of the village for the purpose of flushing out the stream at intervals is not effective in preventing a nuisance being caused by the discharge of sewage into the river. There appears to be no intention on the part of the local authorities to carry out the plans recommended and approved by this Board for an intercepting sewer and sewage purification plant to dispose of the sewage from the village.

In 1906 the Board approved plans for a complete sewerage and sewage purification plant for the city of Norwalk on the condition that the disposal plant be constructed before any of the proposed sewers were placed in use. Recent investigation shows that this condition has been completely ignored and that available funds have been spent entirely in building new sewers, a large proportion of which discharge into a small

creek through an old outlet near the corner of Washington and Hester streets, with the result that a decided nuisance is created. The attention of the authorities was called to this matter and the mayor replied that the sewers they have been putting in are in the north part of the city which lies very low and the flooding of cellars and surrounding land necessitated the building of these sewers for sanitary and health conditions, and that the work done had been along the lines of the plans approved. He said a disposal plant would probably be built in two or three years.

NUISANCES.

The health officer of Brookside asked the Board's assistance in the abatement of a nuisance in that village caused by the sewage from a private sewer in the village of Bridgeport which empties into a stream flowing through Brookside. An engineer was sent to the village and reported that the sewer, by virtue of the point of its discharge and the character of its effluent, created a decided nuisance in the village of Brookside, and that the nuisance could be easily abated by connecting the sewer with either the sewers of Bridgeport or Brookside and at little expense. A copy of the report was furnished the health officer of Brookside with full instructions for abating the nuisance and a copy of the laws containing the sections under which he would have authority to act in the matter.

Several communications were received from Lynchburg and an engineer was sent there to gather information relative to the disposal of the sanitary wastes of the village. The conclusions of his report were that very objectionable odors are created by the discharge of creamery wastes and sewage into the open ditch tributary to Turtle Creek, and as this ditch receives practically all the drainage from the village it is expected that the nuisance will become worse. A copy of the report was furnished the village authorities and they were advised that the best plan to be followed to correct the nuisance complained of would be the introduction of a sewer system; the fact that they have a public water supply making sewerage a necessity, and they should take the matter up with the view of providing for a proper system of sewers at as early a date as possible.

Upon request of the health officer, one of the engineers visited Leipsic to inspect the unsanitary condition of Hickey Ditch, which has been the cause of numerous complaints. The ditch, into which a storm sewer empties, was found to be in a filthy condition, giving rise to very disagreeable odors. This sewer was a necessity and improved the sanitary conditions within the corporation limits but its improper use has increased and transferred the nuisance to the county ditch into which it is discharged.

The question as to whether or not this Board has authority to com-

pel the village of Leipsic to enact and enforce an ordinance prohibiting the use of this storm sewer for domestic purposes has been referred to the Attorney General. (No opinion given.)

In the question of abating the nuisance caused by the abandoned stone quarry at Bowling Green the Attorney General held that the matter is properly in the hands of the local board of health (Sections 3652 and 4420) and the absence of direct or immediate hazard to public health and convenience and the character of the nuisance make it a question falling short of that which might properly invoke immediate action on the part of the State Board of Health.

The board of health of Troy asked whether they could compel citizens to abolish vaults or clean and cement all vaults near the public water supply wells. This question was referred to the Attorney General, who held that the board of health has not this power unless it can be proven that the public water supply is endangered, and that the State Board of Health would not have the power unless an epidemic existed due to polluted water.

The Attorney General was also asked for an opinion as to

Whether a member of the board of health could resign his membership and be appointed health officer. The question was raised on account of a general statute which precludes some municipal officers from holding office within one year after their term of office has expired, or their resignation has taken effect. He held that this does not apply to boards of health.

SEWAGE PURIFICATION UNDER CONSTRUCTION.

Sewage purification plants under construction at Louisville and Sebring were inspected, and the experimental plant at Alliance.

Since the October meeting 58 places have been visited by some representative of the Board, and 71 visits have been made.

PUBLIC WATER SUPPLIES

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REPORT ON PROPOSED WATER SUPPLY FOR BRADFORD.

No plans had been submitted for the development of the present proposed water supply for Bradford, but formal action of the Board was requested on the source of supply which it was proposed to use. The project of securing a public water supply had been investigated by representatives of the engineering department during a number of visits made within the past twelve months. Based on these investigations, the following report was submitted:

Bradford is located on the watershed of Greenville Creek, in Newberry Township near the western boundary of Miami County. The present population is estimated at about 1,600. In the past, growth has been comparatively slight, but within the last few years, owing to the location within the village of a Pennsylvania Railroad roundhouse and freight yards, the population has shown a marked increase and will probably continue to increase rapidly for six or eight years to come. The country in and about Bradford is mildly undulating, thus affording good surface drainage, and has a general slope toward the northward into the valley of Ballinger's Run, a small intermittent stream which is tributary to Greenville Creek. The geological formation in Bradford consists of a thick layer of drift deposits having an average depth of perhaps 100 feet, underlaid by Niagara limestone. The drift deposits consist of various strata of gravel, sand, and clay, and are entirely of glacial origin. Water for private use is generally obtained from gravel deposits in the drift, which are as a rule waterbearing. Few of the wells in the village extend to bed rock.

The village as a whole presents a generally neat and clean appearance but as yet there are no public utilities such as a system of sewers and a public water supply, and much inconvenience has been encountered by the lack of these improvements. A considerable quantity of sewage finds its way to improperly constructed storm water drains, resulting at times in a very objectionable nuisance. The general use of outdoor privies and private wells has resulted in somewhat dangerous conditions, as often the privies are so near the wells as to result in pollution of the water that is derived from them. There has long been felt a desire for a public water supply for domestic purposes and fire protection, and at the beginning of the year 1909 an administration was placed in office which was committed to the installation of a water supply at once.

The first project which was considered was a supply from two drilled wells penetrating the rock and located in the northwestern part of the village. A test of these wells, however, indicated that they could be exhausted with a 10-gallon bailer in the course of a few minutes. By some extraordinary course of reasoning, the village authorities decided to drive another well between these two wells although the first two were but 8 or 10 feet apart. The test well was 8 inches in diameter and

extended to a depth of 145 feet. Naturally the results were disappointing.

Next there was considered the drilling of wells on village property in the very heart of the town just south of the Chicago branch of the Pennsylvania Railroad and on Miami Street. This site was quite unsatisfactory as far as surface conditions were concerned, but it was selected in view of the fact that there already existed upon it a public well which was rather extensively used and which was believed to have a large yield. At the same time there was considered another site in the eastern part of the village at the corner of Smithfield and Alexander streets. The surroundings of this site were also somewhat unsatisfactory owing to the presence of numerous habitations within a few hundred feet. There was moreover a likelihood that the locality near the site would become more built up in future. In order to obtain an indication of the quality of water that might be obtained from wells located at these two sites, a sample was taken from the public well above mentioned and from a railroad well about 150 feet distant and north of the second site in the eastern part of the village. Both of these waters were satisfactory from a sanitary point of view but revealed the presence of considerable iron. The village authorities were informally advised that if a pumping test on a test well revealed the waterbearing strata at either site to be uninfluenced by surface conditions, and if further, there was found water in ample quantity, approval would be recommended. Several wells were accordingly drilled on the village site on Miami Street, but a pumping test soon indicated that the quantity of water available was by no means sufficient. Why it was necessary to drill more than one well for a test, and these within a comparatively few feet of each other, has never been explained. The results of this test were very discouraging to the local authorities, and the water supply project was held in abeyance for a considerable length of time.

Early in February of the present year, it was decided to try test wells just southward of the village in open farm land. The tract of land selected is on the west side of Miami Street and about 500 feet south of the present corporation line. An option was secured on two lots, each 60 feet by 200 feet, making a frontage on Miami Street of 120 feet and a depth of 200 feet. Two test wells were located on this property within 15 feet of each other. Within a radius of 500 feet of the wells there is but one building and this a one-story structure used for the manufacture of cement block. In the rear of this building and a distance of about 360 feet from the test wells is a privy. Surface drainage from the vicinity of these buildings is to the northward away from the wells. It is not likely that future developments of the village of Bradford will extend in this direction, and even though the property optioned by the village is somewhat limited in extent, no encroachment of possible sources of contamination need be feared. The test wells were

at first drilled to a comparatively shallow depth, namely, 42 feet, with the expectation of obtaining a supply from gravel deposits found within the drift. The formation penetrated was as follows:

<i>Material.</i>	<i>Depth of Stratum.</i>	<i>Depth to Bottom of Stratum.</i>
Yellow clay	12 feet.	12 feet.
Blue clay	18 "	30 "
Hard pan	7 "	37 "
Gravel	5 "	42 "

The gravel constituted the waterbearing stratum.

Surface indications in the vicinity of the well were not favorable to securing a large yield. The apparent watershed tributary to the wells would hardly exceed 25 acres. A test of one of the wells bore out the surface indications. There could only be obtained about 37,000 gallons per twenty-four hours. When it is borne in mind that this test was made immediately after the winter season when the ground is normally filled with water, it will be seen that this source cannot be considered as at all feasible. A sample was taken of the water which indicated it to be of satisfactory quality from a sanitary point of view, but its great hardness and the high iron content would render it practically unfit for a public supply without treatment.

On failing to obtain an adequate supply from the gravel deposits, it was decided to continue one of the test wells to rock in the hope of securing more water from this source. A test of the deepened well gave somewhat more favorable indications, and it would appear that a yield of about 55,000 gallons per twenty-four hours is obtainable therefrom. This, however, would by no means meet even the present demands of the village, and unless it is made evident that more water is obtainable in this vicinity from the rock, the well should not be developed as a source of public supply.

The local authorities seem to have grown somewhat impatient on account of the money it has been found necessary to expend on preliminary investigations, and seem to hold the State Board of Health partly responsible therefor. It was on this account that an informal recommendation that another pumping test be conducted on the rock well in the presence of a representative of the engineering department of the State Board of Health, was not favorably received. The water supply committee seem content with the quantity of water available, and merely desire to gain the formal approval of the State Board of Health of the project without further pumping tests. Accordingly, Bradford was visited on April 8th by a representative of the engineering department, and samples were obtained after a brief period of pumping with an ordinary hand pump. The results of the analysis of this sample are herewith appended. It will appear therefrom that the water is entirely satisfactory from a sanitary point of view but that it is somewhat

hard and contains a considerable quantity of iron. (The bacterial count is not significant owing to accidental contamination.) The hardness of the water can scarcely constitute an objection to its use for the reason that it is doubtful whether a softer water can be obtained in the vicinity. However, the iron content is higher than was encountered in the railroad well and in the public well on the village property, and is sufficient to cause great discoloration of the water as drawn from faucets. Such a water will undoubtedly give rise to a great deal of popular complaint. On the other hand, there is a possibility that the iron will decrease in quantity with continued pumping, or that an iron removal plant may be later installed when funds are available. It should not therefore be considered as a vital objection to the supply.

At a meeting held April 20th, 1910, the State Board of Health approved a public water supply for the village of Bradford, to be derived from drilled wells located on property several hundred feet south of the south corporation line and on the west side of Miami Street upon the following conditions:

1st. That detailed plans for the development of the supply be submitted to and receive the approval of the State Board of Health; and

2nd. That this approval be considered void unless construction has been begun on or before November 1st, 1910.

The Board also advised the authorities that while the water is of good quality from a sanitary standpoint, the locality where these wells are located, or some other locality, should be thoroughly exploited and the question determined in advance, if possible, that a daily supply of not less than 200,000 gallons is available.

In accordance with the first condition of approval, detailed plans for the development of the proposed water supply for the village of Bradford, prepared by Toney C. Hefel, C. E. of Muncie, Indiana, were submitted May 3rd, 1910. These were referred to the engineering department and the following report made:

The proposition of developing a water supply for Bradford is a comparatively simple one and involves no difficulties that have a sanitary significance. The two wells which it is proposed to use as a first installation will be placed near together and within the pumping station. They will be surrounded by concrete flooring which should protect them from surface contamination. The wells will be pumped by means of power pumps, belt driven by gasoline engines.

As there is considerable doubt as to the availability of a sufficient quantity of water from two wells under all conditions of pumping, it has been deemed necessary to provide for a large storage capacity in two reservoirs. One of these reservoirs will be placed near the pumping station and below the ground. It will be rectangular in form with the following dimensions: Length, 35 feet; width, 18 feet; depth to flow line, 12 feet. The capacity of the reservoir will thus be 57,000 gallons.

The structure will be built of concrete and will be covered by means of a wooden roof. It is proposed to maintain this reservoir full at all times, to be held in readiness for fire emergency or unusual shortage of supply. Further storage will be furnished by an elevated tank of 50,000 gallons capacity and connected with the distribution system. The exact design for the elevated tank has not yet been determined as each bidder will be requested to submit his own designs.

The distribution system involves no unusual features. The pipe will be of standard weight, cast iron, with leaded joints. The sizes to be used are 4, 6, and 8 inches in diameter. The system will be so designed as to permit of ready extension. Very little 4-inch pipe will be used in the beginning, but it is expected that most extensions will be made of 4-inch pipe.

EXAMINATION OF WATER FROM BRADFORD.

PARTS PER MILLION.

Sample Number	Collected	Color	Turbidity	Sediment	Odor	Oxygen Required	Nitrogen as			
							Albuminoid Ammonia	Free Ammonia	Nitrites	Nitrates
9389	1910 April 8	trace	20	trace	none	.50	.004	.158	none	1 cre

Sample Number	Chlorine	Alkalinity	Incrustants	Sulphates	Residue on Evaporation		Iron	Bacteria	
					Total	Loss on Ignition		Number per cc.	Colon Present
9389	5	450	45		587	60	2.6	1900	neg. in 10 cc.

Source of samples: Drilled well

These detailed plans were approved subject to the condition that the approval be considered void unless construction is begun by November 1st, 1910.

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR CADIZ.

A representative of the engineering department visited Cadiz on May 16-17, 1910, for the purpose of investigating a new well proposed for an additional water supply for that village. Subsequently two other wells were drilled in the same general location, and samples submitted to analysis. The chief engineer reported on the matter as follows:

The proposed new wells are in the same valley as three of the present ones and an average distance of about 3,000 feet southwest from the existing pumping station. They are located on land owned by a company of Cadiz business men, and the land is used in part for a Chautauqua grounds. The elevation is about 40 feet lower than that of the pumping station.

Well No. 6, which was completed at the time of inspection, is 150 feet deep and the material passed through in sinking it is the same as that pierced by the old wells, as follows:

Surface drift	12 feet.
Gray shale	20 "
Red shale	18 "
Sand rock (waterbearing)	50 "
Limestone, with strata of fine, dry sand at intervals	50 "

The supply is secured from the 50 feet of sand rock. The water normally rises to within about 7 feet of the surface, which is about the same actual elevation as the water in the existing wells in this valley.

The new wells are cased for 38 feet below the surface with 6 $\frac{1}{4}$ -inch cast iron pipe, and are thus protected from surface contamination. During the test of well No. 6, the water was pumped from a depth of 98 feet and the estimated discharge was 30 gallons a minute.

Samples of the water from the new wells have been analyzed in the laboratories of the State Board of Health, and the analyses show the water to be of excellent quality from a sanitary standpoint except that it was somewhat turbid, which can be attributed to the newness of the wells.

EXAMINATION OF WATER FROM CADIZ.

PARTS PER MILLION.

Sample Number	Collected	Color	Turbidity	Sediment	Odor	Oxygen Required	Nitrogen as			
							Albuminoid Ammonia	Free Ammonia	Nitrites	Nitrates
9456	1910 May 17	none	70	slight	none	0.20	.016	.670	none	none
9494	June 8	trace	65	distinct	none	0.40	.044	.510	none	none
9513	June 20	trace	10	trace	none	0.05	.054	.310	none	none
9457	May 17	none	none	none	none	none	.004	.002	none	trace

Sample Number	Chlorine	Alkalinity	Incrustants	Sulphates	Residue on Evaporation		Iron	Bacteria	
					Total	Loss on Ignition		Number per cc.	Colon Present
9456	15	271	none		472*	25*	4.0*	156	Neg. in 10 cc.
9494	12	234	30		604*	134*	1.5*	600	Neg. in 10 cc.
9513	9.0	257	none		391	17	1.2	360	Neg. in 10 cc.
9457	21.5	245	32.5		441	39	0.4	131	Neg. in 10 cc.

Sample No. Sample No.

9456. 9494.

*Dissolved: Total solids 443 491

Loss on ignition 32 75

*Iron in solution 0.2 0.8

Source of Samples.

No. 9456, Well No. 6, proposed additional water supply.

No. 9494, Well No. 7, proposed additional water supply.

No. 9513, Well No. 8, proposed additional water supply.

No. 9457, Wells Nos. 1, 2, 3, 4 and 5, present public supply; sample collected from tap at pumping station.

At a meeting held July 27th, 1910, the State Board of Health approved these new wells, known as Nos. 6, 7, and 8, and located an average distance of 3,000 feet southwest of the existing pumping station, as an additional water supply for the village of Cadiz.

REPORT ON PROPOSED NEW WATER SUPPLY FOR CANAL FULTON.

On May 23rd, 1910, a communication was received from the Frick & Lindsay Company of Pittsburg, owners of the Canal Fulton water works, requesting approval of a new source of water supply for that village. A member of the engineering department visited Canal Fulton on May 26th, 1910, and again on June 29th for the purpose of obtaining general data relative to the new source and to collect samples from the new well. The following report was submitted:

Canal Fulton is located in the northwestern portion of Stark County on the Tuscarawas River. Its population is about 1200 and is not increasing rapidly. The village is situated in the river valley, on each side of which the hills rise to an elevation of about 100 feet. The rocks in the hills are to a limited extent waterbearing and have furnished the public supply up to the present time.

The present public water supply of Canal Fulton was first placed in operation in the early part of 1902, being obtained from springs near the top of the hills west of the village. The use of these springs was approved by the State Board of Health June 27th, 1902. This supply, however, became inadequate within a few years and without the knowledge or approval of the State Board of Health was supplemented by a well belonging to a near-by farm house. On January 19th, 1906, the assistant engineer of the Board visited Canal Fulton for the purpose of making a general examination of the public water supply and found that the combined yield of the springs and the additional well was inadequate; work was then in progress of drilling new wells located near the storage reservoir. The use of these wells as an additional supply was approved by the State Board of Health, and the superintendent of water works was so notified on March 14th, 1906. As a result of the investigation of 1906, when a sample was collected from the additional well at the farm house and found to be of unsatisfactory quality, this well was abandoned and has not since been used as a source of supply.

On August 7th, 1908, a representative of the engineering department visited Canal Fulton and made a general examination of the public water supply. At this time five springs and five drilled wells were furnishing the supply. Samples collected from the springs indicated the water to be of unsatisfactory quality, and their use was abandoned soon after this investigation. Since that time the drilled wells which were installed in 1906 have furnished the entire supply. The yield of these wells has never been entirely satisfactory and has recently been so low as to make necessary the establishment of a new source. At present not over 9,000 gallons per day can be pumped from the wells near the reservoir, and inasmuch as the demands of the village in summer would

require a yield of at least 35,000 gallons per day, it will be seen that the present supply is totally inadequate.

PROPOSED NEW SUPPLY.

In the early part of 1910, a well was drilled in the valley of the Tuscarawas River near the central portion of the village, with the hope of securing a sufficient supply of satisfactory quality. The well is located immediately north of Cherry Street, about 100 feet west of the Tuscarawas River, on a tract of land 25 feet square which has been optioned by the water works company. The well extends to a depth of 240 feet and penetrates the following formations:

<i>Strata.</i>	<i>Thickness.</i>	<i>Depth to Bottom of Stratum.</i>
Clay	18 feet.	18 feet.
Sand	162 "	180 "
Blue clay	4 "	184 "
Coarse gravel and sand	56 "	240 "

The well is cased with a 6-inch casing throughout its entire depth and is not provided with a strainer. The water rises from the coarse gravel stratum to a point 2 feet below the surface of the ground. This level is at least 6 feet above the level of the Tuscarawas River. By pumping at the rate of 60 gallons per minute or 88,000 gallons per day, the water level in the well is lowered about 10 feet, but recovery occurs immediately after the pump is stopped. The territory immediately surrounding the well is not thickly built up, but within a radius of 500 feet there are perhaps ten to twelve privies, four of which are within 250 feet of the well. Owing to the great depth of the well and the protection of the waterbearing stratum afforded by the blue clay, the presence of these sources of pollution will probably not prove detrimental to the quality of the water.

No pumping tests to determine the yield of the well have been made beyond the short periods of pumping preceding the collection of samples. It seems reasonable to conclude, however, that the supply is sufficient for the requirements of the village. It is proposed to locate a pumping station on the new site and abandon entirely all of the old sources of supply; retaining, however, the old reservoir to supply storage and to equalize pressure.

Quality of Water. On May 26th, 1910, at the time of the engineer's visit, it was impossible to collect a sample from the well, and instructions were given to Mr. Albert Fellmeth, mayor of the village, in order that he might collect samples as soon as a pump was placed on the well. This sample was collected on June 2nd, 1910, but owing to its unsatisfactory quality as indicated by the bacterial content, a second sample was deemed necessary. Accordingly, on June 29th, 1910, after seven hours' con-

tinuous pumping, at the rate of 60 gallons per minute, samples were collected by a representative of the engineering department. The analysis of the recently collected sample indicates a water of satisfactory quality from a sanitary standpoint and one has not been affected by polluting influences. The iron content which was objectionably high in the first sample is greatly reduced in the recently collected sample, and it seems quite likely that with continued pumping the iron will not prove objectionable. In all other respects the water is a suitable one for domestic and general public use.

EXAMINATION OF WATER FROM CANAL FULTON.

PARTS PER MILLION.

Sample Number	Collected	Color	Turbidity	Sediment	Odor	Oxygen Required	Nitrogen as			
							Albuminoid Ammonia	Free Ammonia	Nitrites	Nitrates
9475	1910 June 2	trace	5-	trace	sweetish	0.75	.010	.130	none	none
9534	June 29	trace	3	trace	none	0.10	.018	.144	none	none

Sample Number	Chlorine	Alkalinity	Incrustants	Sulphates	Residue on Evaporation		Iron	Bacteria	
					Total	Loss on Ignition		Number per cc.	Colon Present
9475	67	212	none		370	26	1.5	1400	Pos. in 10 cc.
9534	23	214			282	23	0.5	54	Neg. in 10 cc.

Source of Samples.

No. 9475. Proposed public supply well. Sample collected by Mr. Albert Fellmeth, mayor.

No. 9534. Proposed public supply well. Sample collected by Mr. R. F. MacDowell.

July 15th, 1910, the State Board of Health approved the tract of land lying between the Tuscarawas River and the Pennsylvania Railroad and extending 200 feet north from Cherry Street, for the location of water works wells, said wells to extend to a depth of at least 200 feet

and to be protected against the entrance of water from any stratum less than 200 feet from the surface, subject to the following conditions:

1st. That the said tract of land be abandoned should the quality of the water deteriorate;

2nd. That the State Board of Health be notified of the drilling of additional wells; and,

3rd. That this approval be considered void unless the new water works plant is completed on or before January 1st, 1912.

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR CARROLLTON.

On September 1st, 1910, Dr. A. H. Hise, health officer of Carrollton, made request for approval of the use of certain ponds as an additional source of public water supply for that village. On September 13th, 1910, a representative of the engineering department of the State Board of Health visited Carrollton and made the necessary inspection. The following report was submitted:

The present water supply of Carrollton is obtained from five wells varying from 75 to 100 feet in depth and located near Indian Fork Run. The water from these wells, as shown by recent analysis, is safe for domestic use, but the available quantity is inadequate for the village. It is proposed in the near future to increase the supply by drilling two more wells not far from the existing ones.

For the present, however, it is desired to connect with two ponds located within one hundred feet of the present wells and pumping station, which ponds are fed by a branch of Indian Fork Run, and to use these as an emergency supply.

Our investigation has shown that the quality of water from these ponds is not satisfactory, and that they are subject to dangerous pollution. For sanitary reasons, therefore, they should not be connected with the public supply. If, however, it is absolutely necessary to use the ponds in order to have some emergency source for fire protection, it would be reasonable to allow them to be connected to the pumping station until the new wells can be drilled; but the valve controlling the admission of water from this source should be locked and the key held by the health officer.

EXAMINATION OF WATER FROM CARROLLTON.

PARTS PER MILLION.

Sample Number	Collected	Color	Turbidity	Sediment	Odor	Oxygen Required	Nitrogen as			
							Albuminoid Ammonia	Free Ammonia	Nitrites	Nitrates
9779	1910 Sept. 13	10	32	slight	veg.	4.35	.414	trace	0	0
9780	Sept. 13	12	18	slight	none	3.95	.450	.004	0	0
9781	Sept. 13	11	trace	sl. trace	none	.05	.024	.270	trace	0

Sample Number	Chlorine	Alkalinity	Incrustants	Sulphates	Residue on Evaporation		Iron	Bacteria	
					Total	Loss on Ignition		Number per cc.	Colon Present
9779	1.5	26	2.5		99	27	1.1	1800	Pos. in 10 cc. Atyp. colon in 1. cc.
9780	1.5	35	none		91	27	.6	720	Pos. in 10 cc. Atyp. colon in 1. cc.
9781	5.5	216	none		287	23	.6	370	Neg. in 10 cc. Atyp. colon in 10. cc.

Source of Samples.

9779. South pond, proposed additional water supply.

9780. North pond, proposed additional water supply.

9781. Tap at pumping station; sample represents five wells of existing supply.

December 7th, 1910, the State Board of Health disapproved the use of these two ponds as an additional source of water supply for Carrollton unless the valve controlling the admission of water from this source to the pumping station be locked and the key kept in the possession of the health officer with the understanding that the water would be admitted only in case of emergency and that whenever this was done the public would be warned by the health officer to boil the water.

The authorities were notified that this action was taken with the understanding that immediate steps were to be taken to secure a sufficient and pure water supply from wells, after which the ponds are to be permanently cut off.

REPORT ON PROPOSED DEVELOPMENT OF EXISTING WATER SUPPLY OF COSHOCTON.

On October 21st, 1910, Mr. A. M. Fisher, superintendent of water works of Coshocton, presented plans and specifications prepared by Mr. L. E. Chapin, consulting engineer, for proposed improvement of the public water supply of Coshocton. The plans were referred to the engineering department and the following report was submitted:

The present public water supply of Coshocton is derived from a dug well 34 feet in diameter and some 30 feet deep, located on the bottom land between the Tuscarawas and Walhonding rivers. The elevation of this land is about 8 feet above average low water stage in the river, and is therefore subject to flood in times of even moderately high water. The land is composed of coarse gravelly river deposits containing much water.

The sides of the well are walled with brick and stone masonry, and the top is covered with an arched dome in which is a watertight man-hole cover. This construction is said to be efficient in causing all the water to enter the well through the bottom, regardless of the stage of the river, and in this way filtration through the soil and gravel is secured. On the other hand, it is stated that when the dome over the well is completely submerged, air bubbles are seen rising to the surface of the water, which might indicate a lack of absolute watertightness.

While the present well is considered capable of supplying the present needs of the city, or 1,500,000 gallons per day, yet in order to obtain this quantity of water it is necessary to operate the pumps with an excessive suction lift, with a result that considerable sand is drained into the well under the walls.

Proposed Development. In order to obviate the objections to the present system, that is, as regards excessive suction lift and the drawing in of sand, it is proposed to install eleven new tubular wells, each 10 inches in diameter and about 50 feet deep, and to place all of these within 200 feet of the present dug well. The tubular wells will all be connected with a 20-inch cast iron suction line, which will connect with the existing suction line of the same diameter at a point near the present well. The casings of the new wells will be cut off at a point about 18 feet below the ground, and a 6-inch suction pipe 20 feet long will be inserted in the casing. A valve will be placed between this suction pipe and the lateral which connects it to the main 20-inch horizontal suction line. A brick manhole with watertight cover will be built around this valve down to the top of the well casing. As this valve is some 8 feet below the ground water level, these manholes will be at all times flooded; this will constitute an objection, as the manholes cannot be entered or inspected. From a sanitary standpoint, no objection can be offered to the proposed development, there being no sources of pollution in the

vicinity, except the flood water of the rivers, which, it is expected, will be amply filtered before reaching the wells.

The consulting engineer was informally advised by the engineering department that in its opinion the system would be more efficient and economical if certain pipes were enlarged from 6 inches to 8 inches. In replying, the consulting engineer did not agree with the opinion of the engineering department of the State Board of Health and gave definite reasons for his position. In view, however, of the fact that there is some doubt as to the influence of this feature of the design upon the sanitary quality of the water, the matter will not be further discussed.

On November 25th, 1910, the State Board of Health approved the plans for the proposed improvements of the public water supply of Co-shocton, prepared by Mr. L. E. Chapin, consulting engineer, and submitted by the superintendent of water works on October 21st, 1910, with the understanding that this approval should become void if construction were not begun before January 1st, 1912.

The attention of the authorities was called to the necessity of designing the manholes, which are located over the wells, in such manner as to prevent the direct passage of river water into the supply.

REPORT ON PROPOSED WATER SUPPLY FOR DUNKIRK.

On September 10th, 1910, plans for a proposed water supply for Dunkirk were submitted by Mr. Chas. Brossmann, of Indianapolis, Indiana, consulting engineer for the village. On November 3rd, 1910, at the request of Mr. Chas. Brossmann, one of the assistant engineers visited that village for the purpose of making an examination. The following report was submitted:

Dunkirk, a village of about 1,200 population, is located at the headwaters of the Blanchard River, in the extreme northerly portion of Hardin County. The topography within the village and surrounding country is level. Drainage takes place in a general northeasterly direction to a small intermittent stream which rises a short distance west of the village and passes around its northerly limits, thence following a southeasterly course to the Blanchard River. The locality is underlaid by the Waterlime, Niagara and Clinton limestones, the total thickness of which is reported to be about 400 feet. The Waterlime has a thickness of 6 to 8 feet in most portions of the villages, but in the extreme southern portion it has been removed entirely and the Niagara is first encountered in drilling wells. The Waterlime when present is found in thin bedded layers and is somewhat waterbearing. The Niagara limestone, which lies immediately below the Waterlime, is somewhat porous in its upper portion but becomes massive a few feet below the top. It is waterbear-

ing in veins encountered at various depths in the formation. The Clinton limestone is not known to be waterbearing.

The drift deposits covering the bed rock are of glacial origin and consist principally of clay. The thickness of these deposits varies from 5 to 15 feet.

Dunkirk is primarily a farming center and contains no important manufacturing industries. There is, however, a large quarry owned by the Pennsylvania Railroad located east of the central portion of the village. The quarry has been excavated to a depth of 40 to 50 feet. It is said that a number of private wells near the quarry have been drained of their supply. The private wells in general use throughout the village are drilled wells extending the depths of from 40 to 100 feet and cased through the drift deposits into the stone. The water from private wells is popularly thought to be entirely satisfactory, but in some cases at least this opinion is erroneous.

The financial condition of the village may be stated as follows:

Assessed valuation, 1909	\$306,000.
Bonds voted for water works	21,000.

Up to the present time no public improvements, such as sewerage facilities, street paving, etc., have been installed by the village.

PREVIOUS INVESTIGATIONS OF THE STATE BOARD OF HEALTH.

The proposition of installing a public water supply at Dunkirk was first brought to the attention of the State Board of Health in July, 1910. At this time a representative of the engineering department visited Dunkirk and inspected two proposed sites for water works. These sites are known as the Heitzman and Taylor sites, and are located in the south-westerly and southerly portions of the village, respectively. Both locations were found to be satisfactory and at the time of the inspection it was informally suggested that the Baughman site directly south of the Taylor site was also satisfactory for the location of public supply wells. Neither the Heitzman nor the Taylor site was selected by the village, however, owing to difficulty encountered in their purchase.

On August 17th, 1910, two new sites were examined by a representative of the engineering department, known as the Wood and Patrick site, and the Stevenson site, located in the southeasterly and westerly portions of the corporation, respectively. The examination demonstrated the unsuitability of the Wood and Patrick site, but the Stevenson site was found to be satisfactory. The following letter informally approving the latter site was sent:

"COLUMBUS, OHIO, August 19th, 1910.

MR. JOHN BAUGHMAN, *Mayor, Dunkirk, Ohio*:

DEAR SIR:—As a result of the recent inspection of the proposed new water works sites by a representative of this department, I should be willing to recommend approval of the "Stevenson site," so-called, provided:

- 1st. That you purchase enough ground so that none of your future wells need be more than 400 feet from any boundary of your property.
- 2nd. That the wells are tightly cased through all porous limestone.
- 3rd. That the quality of the water from the test well at the end of a two or three day pumping test prove satisfactory."

After receiving this informal approval it developed that the Stevenson site could not be satisfactorily purchased, and it became necessary to secure a new location. The Baughman site was therefore selected, having been informally approved during the examination by a representative of the engineering department in July, 1910.

In brief, the water works improvements contemplate obtaining a supply from a drilled well on the Baughman site, the water to be pumped by a deep well pump directly into the distribution system, storage and equalized pressure for which will be furnished by an elevated tank.

Source of Supply. The Baughman site, an option for which has been secured by the village, is located in the extreme southerly portion of the village just east of the T. & O. C. Railroad tracks, and but a short distance from the Taylor site, described in a previous report. It has an area of two acres, having a frontage of 336 feet on a highway which passes the site. Only one dwelling is within 500 feet of the site, this one being located directly opposite on the highway before referred to. The next nearest dwellings are about 700 feet distant. The locality will, however, probably experience some building improvement in future years, depending to a large extent upon real estate valuation set by the present owners. The growth of the village is slow, however, and no extensive growth in this locality is likely.

One well has been drilled on the Baughman site. This well is 221 feet deep, the first 100 feet being 10 inches in diameter, and the lower 121 feet 8 inches in diameter. It penetrates the following formations:

Yellow clay	8 feet.
Blue limestone	127 feet.
Brown limestone	8 feet.
White limestone	78 feet.

The casing in the well extends to a depth of 20 feet from the surface, or 12 feet below the top of the limestone. It is fitted tightly in the well opening and probably prevents entrance of shallow sub-soil drainage. The blue limestone is solid throughout most of its depth, but is found to be waterbearing in three veins at distances of 40 feet, 62 feet, and 72 feet from the surface. A fourth vein was found at the line of separation of the blue and brown limestone. Below this point no water was encountered. The water from the three upper veins before pumping stood at 27 feet below the surface, and from the four veins the static head was 55 feet below the surface.

It is the intention to lower the suction of the pump sufficiently to extend below the lowest vein, and thus make available all water reaching the well. The relative strength of the different veins has not been determined.

Pumping Station. The plans provide for the construction of a neat brick building, 18 by 30 feet, to house the pumping machinery. The well will be pumped by a double-acting, deep well pump, double geared and belt driven by a gasoline engine. The pumping capacity will be 150,000 gallons per 24 hours. The pump barrel will have its suction, as has been stated, at a point below the lowest waterbearing horizon.

Elevated Tank. For storage and pressure, permitting intermittent pumping, an elevated tank is to be located near the pumping station. It is to be of steel construction, covered with a substantial steel roof, and is to be 18 feet in diameter by 20 feet deep in the straight. Its total capacity will therefore be 49,500 gallons, and its capacity above the bowl 38,000 gallons.

Mains. The distribution system is to be extended for fire protection and domestic conveniences to nearly every portion of the village. The total length of mains as planned is 3.6 miles, equivalent to 3 miles per 1,000 population. The sizes of the mains are distributed as follows:

<i>Size of Pipe.</i>	<i>Length.</i>	<i>Per Cent. of Total Length.</i>
4-inch cast iron	15,200 feet	80.6
6 " " "	350 "	1.9
8 " " "	3,300 "	17.5

It will be noted that the percentage of the 4-inch mains is very large and not in accordance with the accepted methods of best design for distribution systems. The use of the great length of 4-inch mains is in probably due to insufficient funds.

Thirty fire hydrants, or 8 per mile of main, are planned for fire protection. These should be adequate.

Quality of Water. Samples of water obtained from drilled wells penetrating the limestone and located near the site proposed for public supply wells have been collected on two occasions, namely, July 18th, and November 3rd, 1910. The results of the analyses are appended to this report.

The samples collected on July 18th, 1910, were taken from two private drilled wells known as the Woodruff and Henderson wells, and located 600 feet east and 600 feet north of the Baughman site, respectively. The analysis of the sample from the Woodruff well indicates a water of satisfactory quality from a sanitary standpoint. This well is said to be satisfactorily cased into solid limestone and the analytical results indicate that such is true. The analysis of the water from the Henderson well indicates serious contamination, probably due to the

presence of a privy about 50 feet from the well. The shallow sub-soil drainage has ready access to the well owing to a poorly fitted casing which terminates in porous limestone.

The samples collected on November 3rd, 1910, were taken from the Woodruff well, and from the test well on the Baughman site proposed for a public supply. The analysis of the water from the Woodruff well agrees closely with the previous analysis of this well and indicates the same satisfactory features. The analysis of the sample taken from the test well indicates a water of entirely satisfactory quality from a sanitary standpoint and one satisfactory for domestic use. Owing to its excessive hardness, however, it cannot be considered satisfactory for boiler use. The physical characteristics of the water are at present not entirely satisfactory, but continued pumping of the well will probably bring about an improvement. The water as pumped from the well is somewhat sulphuretted, which condition produces a slight turbidity upon exposure to the air.

Quantity of Water Available. No complete pumping test to determine the total available yield of the well has been made. A test to determine the partial yield was made November 1-3, 1910, and resulted satisfactorily.

The well was originally drilled to a depth of 187 feet, waterbearing horizons being encountered at depths of 40 feet, 62 feet, 72 feet, and 135 feet below the surface. The casing in the well extended to a depth of 100 feet, cutting off the three upper horizons. With the end of the suction pipe 80 feet below the surface, a pumping test was undertaken about October 15th, 1910. Five minutes after the start of the test, however, the water in the well was drawn below the suction pipe and the test was therefore abandoned.

After this failure the well was deepened to 221 feet, for the purpose of searching for a deep-seated waterbearing horizon. No water was encountered, however, in this drilling. Inasmuch as the first test did not indicate that an adequate supply could be obtained from the horizon at 135 feet depth, it was considered necessary to pump from the three upper horizons to secure a sufficient quantity. The casing was therefore raised so that its bottom was 20 feet below the surface of the ground. This permitted water to be drawn from the four waterbearing horizons before described. The end of the suction pipe was placed at a depth of 100 feet below the surface, and during a period of 48 hours from November 1st, to 3rd, the well was pumped at an average rate of about 75 gallons per minute without indications of failure. When the rate of pumping was increased to 100 gallons per minute, the well was pumped down below the suction pipe in eight minutes.

It was thought advisable by the consulting engineer to test the well to its full capacity by lowering the suction pipe to such an extent that all of the waterbearing horizons would be above the suction limit. The

attempt to make a test under these conditions, however, resulted in failure, owing to the inability of the machinery to withstand the load placed upon it.

Judging from the pumping tests made, it would appear that the maximum yield which may be expected from the well during steady pumping is 75 gallons per minute. The yield may increase when proper machinery is installed, by which the suction may be taken from a sufficient depth and, moreover, the yield may naturally increase as the well is used, due to the opening of the waterbearing veins by pumping. In any event, it would appear that by the addition of other wells properly located a sufficient supply may be made available.

EXAMINATION OF WATER FROM DUNKIRK.

PARTS PER MILLION.

Sample Number	Collected	Color	Turbidity	Sediment	Odor	Oxygen Required	Nitrogen as			
							Albuminoid Ammonia	Free Ammonia	Nitrites	Nitrates
9577	1910 July 18	trace	none	none	none	.30	.036	.042	trace	trace
9578	July 18	trace	none	none	none	.80	.086	.028	0	24
10000	Nov. 3	trace	10	trace	oily (sl.)	2.95	.098	.260	0	trace
10001	Nov. 3	trace	trace	trace	none	.50	.088	.020	0	.2

Sample Number	Chlorine	Alkalinity	Incrustants	Sulphates	Residue on Evaporation		Iron	Bacteria	
					Total	Loss on Ignition		Number per cc.	Colon Present
9577	16	346	35		530	58	.1	3	Neg. in 10 cc.
9578	48	306	165		876	275	.4	48	Pos. in 10 cc.
10000	3	336	132.5		698	128	.1	6	Neg. in 10 cc.
10001	10	338	42.5		496	82	1.	180	Neg. in 10 cc.

Source of Samples.

Nos. 9577 and 10,001. Irwin Woodruff's private well. This well is located at the Woodruff residence, about 600 feet east of the Baughman site. The well is drilled 56 feet deep, penetrating 6 feet of surface clay and 60 feet of limestone. It is cased a short distance into the stone.

No. 9578. Henderson's well, located about 600 feet north of the Baughman site. This well is 91 feet deep, penetrating 12 feet of surface clay and 79 feet

of limestone, the upper portion of which is porous. Cased 14 feet. Privy 50 feet from well.

No. 10,000. Test well on Baughman site, proposed for public supply. For description see foregoing report.

All above samples collected by W. H. Dittoe.

SUMMARY.

From the foregoing report it appears that a water satisfactory as a public supply may be obtained from drilled wells located on the Baughman site. The quality of the water obtained from the test well is entirely satisfactory from a sanitary standpoint, but it should be noted that the quality of the water depends upon the exclusion of the shallow sub-soil drainage and the use of the deep seated waters only.

From the standpoint of quantity of water available the pumping tests have not indicated an entirely satisfactory yield. The addition of future wells, should such become necessary should, however, produce a sufficient yield.

In general, the features of the water works improvements, including the pumping station and machinery, the elevated tank and the distribution system, are well and substantially designed.

These plans, submitted September 10th, 1910, by Mr. Charles Brossmann, consulting engineer, for a public water supply to be obtained from drilled wells located on the Baughman site were approved by the State Board of Health November 16th, 1910, provided:

1st. That all supply wells be cased through surface deposits and porous limestone into the solid rock and obtain their water from deposits of 40 feet or more;

2nd. That the village purchase or otherwise control the property east of the test well for a distance of 400 feet;

3rd. That all present and future privies within 500 feet of any supply well be constructed with surface boxes maintained watertight and closed from the air and regularly cleaned; and,

4th. That this approval be considered void unless construction shall have been begun prior to April 1st, 1911.

REPORT OF PROPOSED WATER SUPPLY AND SEWERAGE FOR GRANDVIEW HEIGHTS.

On November 10th, 1910, there was submitted by Mr. E. G. Bradbury of Columbus, consulting engineer, general plans and description of proposed water supply and proposed sewerage system for the village of Grandview Heights. The plans were referred to the engineering department and the following report was made:

Grandview Heights is a suburb of the city of Columbus, located on the high land bordering the Scioto River valley some four miles north-

west of the center of the city. The present population of the village is about 500, and the area is 0.3 square mile. The total length of streets amounts to about five miles.

At the present time the village has neither a public water supply nor sewerage system. Many of the houses discharge into an open ditch and storm water sewer which has been the cause of considerable complaint.

As the plans for the water works provide for obtaining the supply from the city of Columbus and as the plans for the sewerage system provide for discharging the sewage into the Columbus sewers, the proposed work is from an engineering standpoint no more than an extension of the Columbus improvements into a new district. Nevertheless, as Grandview Heights is an independent corporation, the plans for this work should according to law be acted on by the State Board of Health.

Proposed Water Supply. It is proposed to obtain a water supply from the city of Columbus. The plans provide for installing a 12-inch cast iron main beginning at the Columbus city pumping station, extending westerly along Dublin Avenue as far as Grandview Avenue, and then northerly through Grandview Avenue to the corporation line of Grandview Heights.

Although not more than 400 or 500 people will use the water supply in the immediate future, the distribution system has been designed to supply at least 5,000. The system will include 16,289 feet of 6-inch pipe; 7,715 feet of 8-inch pipe; and 5,591 feet of 12-inch pipe. Ample provision has been made as regards the locating of hydrants, and the same pressure will be available that is available in the city of Columbus.

The estimated cost of the distribution system, which in this case constitutes the entire water works installation, is about \$38,000. It is stated that the water rates will be ten percent higher than the rates charged to residents of the city of Columbus.

Proposed Sewerage System. The plans for the sewerage system provide for constructing sanitary sewers in all of the streets of the village. These sewers will range from 6 inches to 15 inches in diameter. The main intercepting sewer is to begin near the corner of Broadview Avenue and Goodale Boulevard, and extend from there to the Columbus intercepting sewer at a point in Goodale Street about 100 feet east of the Olentangy River. This main sewer will be in part 12 inches and in part 15 inches in diameter. It will pass under the Olentangy River by means of a siphon consisting of two 8-inch cast iron pipes. Exclusive of this main sewer, the system will include 2,395 feet of 6-inch pipe; 11,262 feet of 8-inch pipe; and 3,195 feet of 10-inch pipe.

While not more than 37,500 gallons of sewage, based on a per capita yield of 75 gallons, is expected in the immediate future, the sewerage system will be capable of receiving and conveying to the Columbus interceptor 1,300,000 gallons, which represents a population of 5,000 at 150 gallons per capita, and provides also for infiltration into the sewers at the rate of 60,000 gallons per mile for ten miles of sewers.

No automatic flush tanks will be provided, the intention being to flush the sewers by hand with a hose under pressure from the water works. This method of cleaning sewers, while apparently crude, seems to be growing in favor with engineers who have had charge of the maintenance of sewerage systems.

The consulting engineer states that the sewers will be ventilated through the manholes, but no statement is given in regard to making house connections or arranging for the discharge of cellar drains. There will be no underdrainage system as this is not thought necessary on account of the high elevation of the village and the character of the soil.

December 14th, 1910, the State Board of Health approved the plans submitted by Mr. E. G. Bradbury, consulting engineer, on November 10th, 1910, which provide for obtaining the water supply from the city of Columbus, and for discharging the sewage into the sewerage system of Columbus, the approval to become void if construction is not begun before January 1st, 1913.

REPORT ON PROPOSED WATER SUPPLY FOR HUDSON.

On October 26th, 1910, plans for a proposed water supply for the village of Hudson were submitted by Mr. D. M. Hosford of Cleveland, consulting engineer. In anticipation of these plans being submitted, Hudson was visited by the chief engineer on March 5th, 1908, and by the acting chief engineer on March 9th, 1910. The plans were referred to the engineering department and were reported on as follows:

The present population of Hudson is about 750, and the area is 0.6 square mile. There is no public water supply. The proposed water works are to be installed at the expense of Mr. James W. Ellsworth, a former resident of the village, who is at the same time installing a sewerage system. On completion, both of these improvements are to be presented to the village.

The proposed plans contemplate obtaining a water supply from wells to be located in the southerly portion of the built up part of the corporation, on a 3-acre tract of land which formerly constituted the right-of-way of the Pennsylvania Railroad and which has been leased for water works purposes. There are no houses within 500 feet of the location proposed, and furthermore, the waterbearing stratum in this locality seems to be fairly well protected by an impervious layer of clay.

Five 8-inch wells have already been sunk. These pass through 20 feet of clay and about 56 feet of conglomerate sandstone. The water rose in the casings, after the sandstone was penetrated, to an elevation about 16 feet below the surface of the ground. One of the wells was driven to a depth of 150 feet through blue shale, but after leaving the conglomerate sandstone no more water was obtained.

That the water in these wells has no direct connection with the sur-

face water has been shown by the fact that pumping tests have failed to affect a spring located in the vicinity. A small stream draining an area of approximately 200 acres of farm land passes near the wells, but it is not believed that water from this stream will affect the public supply in any way.

Based on the pumping tests, the consulting engineer estimates that 430,000 gallons per day can be readily obtained from the proposed source. This would be several times more than enough for the needs of the village for a long time in the future. The pumping machinery will be electrically driven, placed some 6 feet or more below the ground, and will receive its motive power from the electric light plant which is located near-by. The make of machinery has not yet been decided upon. The water will be pumped through a 6-inch main to a steel tank tower 85 feet high, the tank being 28 feet in diameter by 34 feet high and having a capacity of about 175,000 gallons.

The distribution system will comprise 1,600 feet of 10-inch cast iron pipe; 4650 feet of 8-inch cast iron pipe; and 10,675 feet of 6-inch cast iron pipe. Only two dead ends will be allowed. The probable number of connections at present will be 50 dwellings, one power house, and ten stores.

EXAMINATION OF WATER FROM HUDSON.

PARTS PER MILLION.

Sample Number	Collected	Color	Turbidity	Sediment	Odor	Oxygen Required	Nitrogen as			
							Albuminoid Ammonia	Free Ammonia	Nitrites	Nitrates
9571	1910 July 13	trace	20	slight	none	.15	.004	.03	0	0

Sample Number	Chlorine	Alkalinity	Incrustants	Sulphates	Residue on Evaporation		Iron	Bacteria	
					Total	Loss on Ignition		Number per cc.	Colon Present
9571	7	400	65		773	195	2.2	132	Neg. in 10 cc.

Source of Sample.

Drilled well located on Pennsylvania R. R. lot between Ravenna street and Railroad street.

These plans, submitted October 26th, 1910 by Mr. D. M. Hosford of Cleveland, consulting engineer, for a water supply for the village of Hudson, were approved by the State Board of Health on November 26th, 1910, with the understanding that the approval shall become void unless construction shall have been begun before January 1st, 1912.

REPORT ON WATER SUPPLY AND SEWERAGE OF LAKE-SIDE.

At a meeting of the State Board of Health on October 19th, 1910, there appeared before the Board Mr. Otto H. Magly, secretary, and one other official of The Lakeside Camp Meeting Association, for the purpose of urging the Board to approve the use of certain recently drilled wells for public water supply purposes. These officials further desired that the Board be as lenient as possible in regard to insisting upon sanitary improvements in view of the financial condition of The Lakeside Camp Meeting Association.

A committee consisting of Mr. John W. Hill, member, together with the chief engineer, was appointed to visit Lakeside and report on the water supply and sanitary conditions. This committee, accordingly visited Lakeside November 19th, 1910, and herewith submits the following report:

The sanitary conditions and water supply of Lakeside have been every year or two, for the past fourteen years, the subject of investigation by the State Board of Health, but with little result as regards permanent improvement of conditions. In 1896 the Board investigated sanitary conditions on account of the prevalence of typhoid fever at that time, and pointed out the necessity for a pure water supply. In 1898 there was installed a system of slow sand filters which were to be used as a temporary expedient until a more substantial plant could be installed. These filters were not intended for permanent use, but nevertheless they have been used from year to year with such repairs as were absolutely necessary in order to prevent them from falling to pieces. Without describing this filtration plant, which has been reported on several times in detail, suffice it to say that analytical tests extending over the past ten years have at no time shown that a sufficient degree of purification was being obtained.

In 1902 owing to the importance of obtaining a sufficient quantity of filtered water, a permit was granted to The Lakeside Camp Meeting Association to introduce into their hotel unfiltered water for flushing closets only. An independent pipe leading from the pumping station to the hotel was provided for this purpose. Nevertheless one or two inspections since 1902 have shown that this unfiltered water was being used

at the hotel in bathtubs, washstands, and kitchen sinks. It has been probably used also for cooking and drinking.

The officials of The Lakeside Camp Meeting Association during the past season have driven two or three wells in different locations about the grounds and provided same with hand pumps, with the idea of supplying a drinking water cooler than that obtained from the lake. These wells extend into the rock; one of them is 186 feet deep, while the others are much shallower. Samples of water from two of the wells analyzed in the laboratories of the State Board of Health, showed at one time the presence of coli in both the 186-foot well and in the 60-foot well, although subsequent analyses did not show the presence of these organisms.

Aside from the question of the quality of the well water, which though not entirely satisfactory, might not be considered absolutely dangerous in view of the later analyses, the question of available quantity is one which would, from such data as are at hand or have been furnished by the local officials, condemn the use of the wells as a source of public water supply. In one case at least, it is possible to lower the water in the well below the possible suction lift by means of a hand pump.

The officials would like to have the wells used for drinking purposes, and the raw lake water or the imperfectly filtered water for flushing and other purposes. Such plan, however, as has already been demonstrated at Lakeside under previous management as well as at numerous other places, is impracticable. The population of Lakeside at certain times of the year, based on the 600 or 700 houses being fully occupied, may reach 5,000 people. An attempt to supply a community of this size with one kind of water for drinking and at the same time have the lake water available in the houses would mean that the latter would be used when convenient. As to the present pollution of the lake water, it is only necessary to point out that the intake is but several hundred feet from shore and nearly in the path of the steamers going to and from Lakeside; and that, furthermore, it is located not more than 1,000 feet easterly from the sewer outlet where is discharged the sewage of Lakeside as well as an adjacent summer resort known as Erie Beach.

It is the opinion of this committee that the only practicable means of obtaining a safe water supply for Lakeside would be a properly constructed filtration plant. This could be of the mechanical or of the slow sand type; but in either case it should be of ample capacity and should be operated during the entire season under intelligent supervision. Furthermore, there should be provided storage for filtered water so that the marked differences in the rate of water consumption during the day will not affect the rate of filtration.

Sewerage System. The main sewer of Lakeside also receives the sewage from Erie Beach and discharges at the end of the dock which is located opposite the westerly boundary of the Lakeside property. This sewer has been within a few years extended from the shore as far as the

end of the dock by means of an 8-inch wrought iron pipe. Nevertheless, it is said that under certain conditions the water immediately east of the dock is so badly polluted that it is impossible to bathe in the lake with comfort. The Lakeside management it is said has warned the people not to bathe in this vicinity. Nevertheless, it would seem that the summer residents at this place were entitled to sufficient protection to enable them to bathe wherever they chose. It is possible that this condition could be remedied by extending the pipe into the lake a distance of 1,100 feet, where as shown by the government chart, deep water will be obtained. Furthermore, a covered screen chamber should be constructed at some convenient point on the line of the main sewer, and the sewage should be thoroughly screened through a screen composed of parallel bars having an opening of not more than one-fourth inch. This screen should be cleaned several times a day, and the screenings should be disposed of by burying at some convenient point outside of the grounds. At the end of the 8-inch iron pipe, 1,100 feet from shore there should be placed several branch pipes in order that the screened sewage may be discharged at three or four different points and thus more readily diffuse through the lake water.

RECOMMENDATIONS.

In reply to the request of the officials of The Lakeside Camp Meeting Association that they be permitted to use wells as a source of water supply, it is recommended by your committee that such wells be disapproved on the ground that it would be impracticable to obtain enough water from the ground to constitute a suitable water supply, and furthermore that certain analyses have indicated that the ground water is at times polluted.

It is further recommended: First, that The Lakeside Camp Meeting Association be notified that the State Board of Health will expect it to submit for approval at the meeting of the Board to be held January 25th, 1911, with a view to installing water purification works prior to July 1st, 1911, definite plans for installing a water purification plant of ample capacity; and second, definite plans for screening the sewage of Lakeside and discharging same through an iron pipe terminating in several outlets at least 1,100 feet from shore.

At a meeting of the State Board of Health held December 7th, 1910, this report, with recommendations, was adopted and the authorities of Lakeside were so notified. The Board was unanimous in the opinion that Lakeside should not be opened for visitors during the season of 1911 unless a perfectly safe water supply is introduced prior to that time.

At a meeting of the Board held January 25th, 1911, the plans of the Pittsburg Filter Manufacturing Company for a water purification plant

for Lakeside were considered and were approved upon the following conditions:

1st. That the clear water basin be enlarged so as to have a capacity of 125,000 gallons;

2nd. That the filter plant be completed and ready for operation before the opening of the season of 1911;

3rd. That full detailed plans be prepared and submitted to the State Board of Health at its meeting on February 23rd, 1911, for approval;

4th. That the said detailed plans provide for readily increasing the capacity of the filter and that such increase be made in the future whenever deemed necessary by the State Board of Health; and,

5th. That the management of the water purification plant be at all times under the direct charge of an experienced and efficient operator, whose appointment shall first be approved by the State Board of Health.

The authorities were also notified that the Board had voted to require that the sewage of Lakeside be screened and that the iron outlet pipe be extended at least 1,100 feet from the shore line, said pipe to terminate in several outlets. This screening and extension, likewise to be done before the 1911 season opens, and plans for the screen chamber to be submitted to the Board on February 23rd, 1911.

REPORT ON THE MIKE HUFF SPRING AS A SOURCE OF ADDITIONAL WATER SUPPLY FOR LEESBURG.

On September 28th, 1910, at the request of Mr. C. E. Pavey, secretary of the board of trustees of public affairs, an inspection was made by the engineering department of the public water supply of Leesburg, with special reference to the propriety of adding thereto the water from Mike Huff spring. Based on this and previous investigations the following report was submitted by the chief engineer:

At a meeting of the State Board of Health, held April 18th, 1906, the Board approved the use of wells for water supply purposes located on the Mike Huff lot, situated in the southeastern part of the village of Leesburg, just north of the Baltimore and Ohio Railroad.

Since that time water works have been built by the village using these wells as a source of supply. The quantity of water available, however, has been so small, that it has not been possible to supply the inhabitants for domestic purposes, the water being reserved chiefly for fire protection.

It is now desired to add to the source of supply by using a spring located about 500 feet northwest of the wells and pumping station, but outside of the territory originally approved for location of wells.

Analyses have been recently made of the water of the Mike Huff spring and show it to be safe and satisfactory. It is higher in nitrates than the well water, but is considerably lower in chlorine.

The field in which the spring is located is used for pasture and about 300 feet to the southwest is a dwelling with privy and chicken yard. Some distance to the northeast is a creamery. These are the only possible sources of pollution within 500 feet of the spring. Some 300 or 400 feet to the northwest of the spring is a dwelling house, but from the topography of the ground, it is not probable that these have an effect on the water of the spring.

In regard to the quantity of water from the new spring, measurements have shown that this will amount to about 20,000 gallons per day, which quantity, although it may not entirely supply the present deficiency, will be a great aid in doing so.

The present supply was installed without first making the adequate pumping tests as to the available quantity. Previous experience with the wells seems to demonstrate that it would not be worth while to attempt to obtain more ground water in the present location, especially as it is necessary to sink the wells fully 200 feet; hence the reason for desiring to use the Mike Huff spring, which can be added to the present supply at comparatively small expense.

At a meeting held October 20th, 1910, the State Board of Health approved the Mike Huff spring, located about 500 feet northwest of the present public supply, as a source of additional water supply provided:

1st. That the village purchase or obtain absolute control over all land within 250 feet of the spring and that no houses, stables, privies or possible sources of pollution of any kind be allowed to be placed thereon;

2nd. That all cesspools and privy vaults within 600 feet of the spring be made water-tight and cleaned at regular intervals at the direction of the local health department; and.

3rd. That this approval be valid only until July, 1911.

The authorities were also notified that it should be understood, in giving this approval, that it was not expected by the State Board of Health that the quantity of water available from the Mike Huff spring would entirely supply the present deficiency of the public water supply.

REPORT ON PROPOSED EXTENSION OF WATER WORKS INTAKE FOR LORAIN.

On April 29th, 1910, there were received from Mr. William E. Knight, director of public service of Lorain, plans for an extension of the water works intake for that city. These plans were reviewed by the engineering department and the following report was made:

The city of Lorain is in Lorain County on Lake Erie and is situated at the mouth of the Black River. Its present population is estimated at 35,000. Growth in recent years has been rapid owing to the development of the ore handling business. Its industries comprise a large steel plant, ship yards, railroad shops, ore and coal handling docks, and a number of general manufacturing concerns. A large part of the population consists of foreigners.

The first water works for Lorain were installed in 1884. The supply was taken from a crib in Lake Erie about 1,440 feet from the shore and 2,000 feet west of the mouth of Black River. This crib is still in existence and is occasionally used. The supply was considered generally satisfactory until 1892, when there was built a system of sewers for the city. The discharge of sewage into the Black River caused a very marked increase in the typhoid fever death rate beginning in 1893. After more or less agitation, a water purification plant of the mechanical filtration type was installed in 1897. This was the first water purification plant installed in the state of Ohio. For seven years it operated fairly satisfactorily, though due to variations in management and experiments with various types of coagulant, there were periods when the purification was not all that it should be.

In 1905 it became plain that the purification plant could no longer meet the needs of the rapidly growing city, and accordingly contracts were entered into for the construction of a new and modern water purification plant having a capacity of six million gallons. This new plant was completed in 1906 and after some months of experimental operation was placed in condition so as to furnish a very satisfactory supply.

Coincidentally with the construction of the new filter plant, a new and large intake was built to a distance of 1,600 feet into the lake. Recently the federal government projected an extension of the inshore ends of the outer breakwaters reaching to the shore line. In the case of the western outer breakwater, this would have the effect of enclosing both of the old intake cribs in such a manner that they would be very greatly affected by the heavily polluted waters of Black River and also by surface drainage that reaches the lake shore directly from the city streets. An extension of the intake was therefore necessary. In preference to extending an existing intake, it was decided to build a new intake of ample size to meet the needs of the city for a great many years in the future and also to build it in a very substantial manner. This was deemed advisable for the reason that the intake must pass under the breakwater, thereby rendering any enlargement or alteration extremely difficult.

The proposed new intake crib will be located 2,780 feet from the present shore line and 1,148 feet beyond the outer breakwater. While it will, of course, receive more or less of the pollution from Black River when the wind is blowing from the east or northeast, yet the new loca-

tion is far more satisfactory than either of the two old locations. Furthermore, the extension of the breakwater will cut off all of the contamination that enters the lake directly to the westward of the mouth of the Black River.

The intake crib will be built of heavy timber frame work to a height of 12 feet above the bottom of the lake. In the center will be a square chamber about 10 feet on a side. Over this will be placed a screen to prevent the entrance of ice and large floating matter. The intake proper will consist of a cast iron 72-inch by 48-in reducing special leading into the 48-inch intake conduit beneath the lake bed. The outer walls of the crib will be 32 feet on a side. The space between the outer walls and the inner chamber will be filled with heavy riprap. Riprap will also be banked around the outside of the structure. The total depth of water at the point of intake is 27 feet, thus leaving a mean depth of water above the intake structure of 15 feet.

At a meeting held June 29th, 1910, the State Board of Health approved these plans for an extension of the water works intake, submitted by the director of public service on April 29th, 1910.

REPORT ON PROPOSED WATER SUPPLY FOR MINSTER.

On January 15th, 1910, a map of the village of Minster showing proposed location for a public supply well, was submitted by Mr. Samuel S. Wyer, of Columbus, civil engineer and contractor, with whom the village has an agreement for the installation of a public water supply. The following report is based on data furnished by Mr. Wyer, and also on a visit made by a representative of the engineering department in November, 1906.

The village of Minster is in the southern portion of Auglaize County on the Erie Canal, and has a population estimated at about 1,500. The area of the village within the corporation limits is somewhat over one square mile. The central portion is thickly built up. A large portion of the uninhabitated area is still in open fields. The surrounding country is very flat and the natural drainage of the village has been somewhat impaired by the presence of the Erie Canal.

The surface material or drift in the vicinity of Minster has a depth varying from about 80 feet in the northern part of the village to 150 feet in the southern part. The drift is composed of clay, though it contains strata or pockets of sand and gravel which serve as sources of ground water supply for numerous shallow dug wells upon which the village at present relies. Below the drift lies Niagara limestone, which is said by local well drillers to have an irregular surface. In all parts of the village water is abundantly found at or near the surface of this rock.

Minster is primarily a farming center, but it contains a creamery of considerable size and several cooperage works.

At the present time the village is provided with neither sanitary sewers nor a public water supply. Domestic wastes are discharged onto the surface of the ground into cesspools, into loosely constructed storm water sewers, and into drainage ditches. This unsanitary way of disposing of wastes results in the creation of offensive nuisances. Old fashioned privies are used entirely, and these are rarely constructed with watertight vaults or with receptacles that prevent fecal matter from finding its way onto or into the soil. From appearances, no thought is given to the location of privies relative to nearby wells and it is inevitable that many wells are thus polluted. An investigation of an epidemic of typhoid fever in November, 1906, revealed that the majority of the primary cases of typhoid fever were directly attributable to the contamination of wells by nearby privy vaults. The report prepared by the State Board of Health on this epidemic pointed out clearly the advisability of installing a proper system of sanitary sewers and a public water supply of good quality from a sanitary point of view. Very little attention was paid to these recommendations at the time, but in the summer of 1909, when there broke out an epidemic of typhoid fever very similar to that investigated by the State Board of Health, the local authorities bestirred themselves with a view to having a public water supply installed at the earliest possible date.

The site proposed for the location of a public water supply well is in the northern part of the village at least 400 feet distant from the nearest building. It is possible to secure enough land surrounding the well to amply protect it against the encroachment of habitations in the future. It is the intention to drill the well into the underlying limestone. The water derived from the limestone, as already suggested, is amply protected against surface contamination by the superimposed stratum of clay.

As an indication of the character of water which might be expected from a public supply well drilled in this location, a sample of water was obtained by Mr. Samuel S. Wyer from a drilled well shown on the accompanying map near the school house. The results of the analysis of this sample indicate a water of satisfactory quality from a sanitary point of view, but on the other hand it is rather hard and contains iron in such large quantities as to cause objectionable discoloration and turbidity. It is possible that upon continued pumping the iron content may be reduced, or that a similar quantity of iron may not be found in other places. This is a matter, however, that can only be determined by drilling and sampling a test well. The hardness, while objectionable, must be expected, since it is not likely that any softer water can be found in this locality in the limestone rock. It is true that the water from shallow wells is softer, but is objectionable owing to the likelihood of its being contaminated. Furthermore, it is not probable that a sufficient quantity

of water can be obtained from shallow wells to meet all the demands of the village.

EXAMINATION OF WATER FROM MINSTER.

PARTS PER MILLION.

Sample Number	Collected	Color	Turbidity	Sediment	Odor	Oxygen Required	Nitrogen as			
							Albuminoid Ammonia	Free Ammonia	Nitrites	Nitrates
9069	1909 Sept. 16	2	40	slight	none	1.0	.072	.550	none	none

Sample Number	Chlorine	Alkalinity	Incrustants	Sulphates	Residue on Evaporation		Iron	Bacteria	
					Total	Loss on Ignition		Number per cc.	Colon Present
9069	6	248	350		986	112	4	170	Not in 10 c.c.

Source of Sample.

Driven well at school house.

At a meeting held January 20th, 1910, the State Board of Health considered this site, shown on the map submitted by Mr. Samuel S. Wyer, January 15th, and the site was approved as a location for public water supply wells for Minster subject to the following conditions:

1st. That sufficient land be owned or controlled by the village to prevent the location, within 300 feet of any public supply well of any building or habitation other than those necessary for water works purposes;

2nd. That before any well is placed in service a pumping test be conducted in the presence of a representative of the State Board of Health for the purpose of giving an indication of the yield of the well and to permit of the collection of representative samples; this approval to be contingent upon both a satisfactory yield and a satisfactory quality of water;

3rd. That full detailed plans and specifications for the develop-

ment of the supply be submitted within sixty days following the definite selection of the source of supply; and,

4th. That the conditions of this approval be considered void unless the before mentioned pumping test shall be conducted by July 1st, 1910.

REPORT ON PROPOSED NEW WATER SUPPLY FOR NEWARK.

On July 19th, 1909, plans were submitted by Mr. Philip Burgess of Columbus, consulting engineer for Newark, for a new source of water supply for that city, such supply to be obtained by a system of infiltration wells in a gravel bar in the Licking River opposite the city's pumping station. Although analyses of samples of water from test wells in the Licking River, made previous to the submission of these plans, had indicated no reason why such a scheme should not be developed satisfactorily, yet it was not considered advisable to definitely approve the system until tests had been made on a permanent installation. Owing to the moderate cost of such an installation, this plan did not mean financial hardship to the city.

On August 2nd, 1910, and again on September 2nd, the installation was studied and samples were collected by the engineering department. The river at these times was low and apparently consisted of ground water of the same character as that which fed the wells. There was probably no infiltration of river water into the wells, the latter being supplied by ground water only.

The analytical results indicated that the water obtained from the new system, with the Licking River at a low stage, was satisfactory. It was thought, however, that the plan should not be definitely approved until opportunity had been afforded for the State Board of Health to examine the infiltration system under higher stages of the river.

The city desired to introduce the new water into the public system on October 1st, 1910, and the director of public service requested permission of the State Board of Health to do this. In view of the fact that even should the wells produce, under high stages of the river, a less satisfactory water than they were producing at the time of examination, yet it was believed that the quality of such water would be much better than the city had hitherto obtained.

In 1906, when the city proposed to install municipal water works without the approval of the State Board of Health the court issued an order prohibiting the use of such water for domestic purposes or the making of house connections, but allowing its use for fire and sprinkling purposes only. (See annual report for 1906, pages 110-11.)

September 29th, 1910, the State Board of Health granted permission

to the city of Newark, until further examinations by said Board determined that the water would be unsatisfactory for permanent use, to temporarily introduce into its distribution system, to be used for domestic and all other purposes, the water from the new system of infiltration wells located in the Licking River opposite the city's pumping station.

REPORT OF PROPOSED EXTENSION OF INTAKE FOR PAINESVILLE WATER WORKS.

In January, 1910, there was received from the director of public service of Painesville, a profile showing proposed extension of water works intake into Lake Erie. The matter was referred to the engineering department for investigation. The following report was submitted:

The city of Painesville and the villages of Fairport and Richmond, all of which use the same water supply, are in the north-central part of Lake County on the Grand River. Painesville is about three miles from the lake shore, while Fairport and Richmond are directly on the lake shore at the mouth of the Grand River. The population of Painesville as estimated from census reports is about 6,000. Fairport and Richmond have a combined population of about 3,000. The public water supply is owned and operated by Painesville and water is supplied to Fairport and Richmond on the meter basis.

Painesville is primarily a residence city, numbering among its population, many who have their business in Cleveland, twenty miles distant. There is located here Lake Erie College, a school for young ladies, which has in the neighborhood of 100 students. There are a few industries in Painesville, such as a factory for the manufacture of veneer machinery, and another for the manufacture of brick machinery. Fairport and Richmond are important ore handling ports. The population is almost entirely devoted to this work.

In all three of the communities nearly the entire population depends upon the public water supply. However, there are still in existence a number of private wells. Many of these are in close proximity to privies and are not sufficiently protected against pollution. Painesville is provided with a sewerage system, all the outlets of which discharge into the Grand River. There are in all 13.7 miles of sanitary sewers, to which nearly the entire population has access. Fairport and Richmond also have a few short sewers which discharge into the river moderate quantities of domestic wastes. The sewage of these communities has special significance in its effect upon the public water supply, receiving at times the sewage polluted waters of the Grand River as they pass beyond the breakwaters at the harbor and are driven over the water works intake.

At present the public water supply is drawn from an intake ex-

tending about 215 feet into Lake Erie and about 1.22 miles southwest of the mouth of the Grand River. A portion of the supply is derived from infiltration galleries built along the lake shore. Owing to the building up of the beach at this point, these galleries a few years after having been built fail to yield a sufficient quantity of water. At such times it becomes necessary to use the direct intake or place new galleries at considerable expense. In past years it has been the practice to use the direct intake at all times. It has also been found that the packing of the ice on the shore prevents the galleries from receiving sufficient water in the winter time, even though they be close to the water line.

The water supply of Painesville has been subject to investigation at frequent intervals by the State Board of Health since 1895. In that year the water works were still in the hands of private parties and the unsatisfactory quality of the water gave rise to much popular complaint. These complaints went so far that on one occasion council refused to pay the city's water rents. In 1900 it was proposed to increase the water supply by placing additional galleries, and approval of this project was asked of the State Board of Health. After an investigation by a committee, the Board voted to disapprove the proposed plans and advised the employment of a competent consulting engineer to make a study of the whole proposition and make recommendations as to the best method of securing an adequate supply satisfactory in quality.

Disregarding the action of the Board, the city proceeded to build 1,000 feet of additional galleries.

During 1906 analyses were made in the laboratory of the State Board of Health of a series of samples collected monthly from April to October. These samples included both Lake Erie and tap water. These analyses demonstrated that a considerable degree of purification was being effected by the infiltration galleries, but that the efficiency of purification was not as great as that which might be expected from a properly constructed filter plant.

On July 24th, 1906, a special election was held for the purpose of voting on a bond issue to devote to the improvement of the public water supply, but this failed to carry.

During the winter of 1906-07, owing to the enforced use of the direct intake caused by the accumulation of ice on the beach, turbid water was furnished to consumers and caused considerable apprehension on account of the appearance of some enteric diseases. As a result of complaints during the latter part of 1906, an investigation was made by the assistant engineer of the State Board of Health, and the results of his investigation were embodied in a report concluding with a summary in part as follows:

"The present method of obtaining a public supply from infiltration galleries, while it improves the water to a certain extent both in appearance and sanitary quality, yet has a number of objectionable features which render necessary its

replacement by a properly constructed filtration plant if an ample supply of good quality is to be always available. The objectionable features are as follows: 1st. The process of filtration is not under proper control. 2nd. Within a few years after their installation the galleries fail to yield sufficient quantities of water for the demands of the city, necessitating the use of unpurified lake water which is frequently dangerously polluted; 3rd. The failure of the galleries, even while new, is also brought about by ice action during the winter, which likewise necessitates using lake water direct during considerable periods of time; and 4th. The discharge of great quantities of sewage which will take place from the outlet of the new Cleveland intercepting sewer in the not distant future will render the lake water near the pumping station considerably more polluted than at the present time and greatly increase the difficulty of purification by infiltration through beach sand.

As discussed under "Cost Data," it will be noted that a filtration plant can be built more cheaply than infiltration galleries capable of yielding a sufficient quantity of water for an equivalent length of time. The filtration plant, on the other hand, will cost more for its maintenance and operation. The cost and operation of the filtration plant need not exceed \$5.00 per million gallons; which with proper restrictions on water waste would not exceed during the first years of its operation \$2,500 per year."

Since the above investigation was made the outer west breakwater has been extended until it reaches the shore line, thus preventing in a large measure the waters from the mouth of the Grand River drifting over the intake. Under these circumstances it is believed by the local authorities that the use of lake water in the vicinity of the intake is not unobjectionable, and it is desired to extend the intake to a distance of 2300 feet into the lake primarily for the purpose of getting beyond the influence of ice action and to obtain a water less liable to contain excessive turbidities.

Believing that the known conditions did not warrant the approval of the State Board of Health to any changes in the public water supply unless such changes involved the construction of purification works, it was thought advisable to have a conference with the local officials for the purpose of presenting this phase of the matter. Accordingly, the acting chief engineer visited Painesville on January 21st, 1910, and met the director of public service; the director of public safety; the secretary of the water and light plant; the superintendent of water works; the city engineer, and the city clerk. It was pointed out that while the data at present in possession of the State Board of Health warranted the recommendation of a filter plant, there were no investigations which would show the effect of the recent extension of the breakwater, and that if the city officials so desired, investigations along this line would be made before reporting upon the project in order to give added weight to any recommendations which might be presented to the State Board of Health with reference to the approval or disapproval of the proposed extension of the intake. This appealed to the officials as the proper way to handle the matter and they seemed inclined to abide by the results

of such investigation, though it was represented that in all probability sufficient funds could not be raised to build purification works at this time. During the latter part of May, two representatives of the engineering department visited Painesville and made a rather extended study of the influence of wind conditions on the direction of flow of water from the Grand River at its outlet. The results of this investigation show quite conclusively that the location of the proposed new intake is very materially affected under certain wind conditions by the water from the Grand River, and furthermore, that there are strong analytical evidences of contamination from sewage discharged into the lake at Cleveland. From a sanitary point of view there is no material difference in the quality of water at the old intake and at the site of the proposed new intake, but a much better water as regards physical characteristics is no doubt obtainable at the location of the proposed new intake. While the water is rather high in bacteria, it is at no time of such poor quality that it cannot be adequately handled by well known purification methods; but without purification it is unfit at all times, no matter what the wind conditions, for domestic consumption.

At a meeting held June 29th, 1910, the State Board of Health approved this proposed extension of the water works intake into Lake Erie, but only upon the condition that at the time contracts are let for its construction, contracts shall also be let for the construction of purification works satisfactory to the State Board of Health.

REPORT ON PROPOSED WATER PURIFICATION FOR PORT CLINTON.

On September 10th, 1910, there were received from Mr. William G. Clark of Toledo, consulting engineer for Port Clinton, plans and specifications for a water purification plant for that village. Prompt action by the State Board of Health was especially requested as it was the desire and intention of the officials to complete the concrete work before freezing weather. The plans were referred to the engineering department and the following report was made:

Port Clinton, the county seat of Ottawa County, is situated on the shore of Lake Erie at the mouth of the Portage River. The present population is estimated at 3500.

PRESENT WATER WORKS.

The present public water supply was installed in 1896. Previous to its installation, in 1895, the project was submitted to the State Board of Health for approval, and the Board after investigation decided to postpone definite action until further studies could be made of the effect of

the lake currents as well as the current of the Portage River on the water in the vicinity of the intake. Notwithstanding this action of the Board, the supply was installed as originally planned.

Several investigations of the quality of the water as pumped into the mains have been made from time to time. These investigations have shown that the water is generally if not always of an unsatisfactory quality. At times it contains a turbidity as high as 237 parts per million, due to the wave action on the clay bottom of the lake and also to the mud brought down by the Portage River, the water from which under certain wind conditions passes directly over the intake.

The intake, which is 16 inches in diameter, is protected by a crib consisting of two square boxes or shelves of heavy timber, the outer being 30 feet square and the inner 12 feet square.

The intake is located 1000 feet west from the end of the pier which forms the mouth of the Portage River, 3900 feet from the pumping station, and 1600 feet from the nearest point on the shore.

The pumping station is located in a public park at the edge of the lake and also on the edge of the river. It is a substantial brick building containing two compound duplex pumps, each having a capacity of one million gallons per day. At present no storage is provided; consequently the pumps have to operate continuously. The average daily consumption is 430,000 gallons; 143 gallons per capita or 165 gallons per person using.

PROPOSED PURIFICATION PLANT.

It is proposed to install a mechanical filter plant to be located in an addition to the present pumping station, which addition will be built from an architectural standpoint to harmonize with the present station. The water will be taken from the lake through the existing intake, described above. It would be much more desirable, however, if the necessary funds can be raised, to extend this intake out into the lake into deep water and beyond the first influence of the Portage River. This would insure a water of purer quality, less likely to sudden and extreme variations, and one which could be filtered more economically and with better results. The general design of the filter plant is based on a capacity of one and one-half million gallons per day, and all piping, valves, etc., are of sufficient size to handle this quantity. It will be noted that this capacity allows for a very large increase in the daily consumption, and in the immediate future will allow of operating the filters during the day time only. The plant is to consist of a low service pumping outfit, two coagulating basins, three filters, coagulant devices, air blower, wash water pump, and storage for filtered water.

Machinery. There are to be two low service rotary pumps, each having a nominal capacity of one million gallons per day and an overload capacity of twenty per cent. The wash water pump is also to be

of the rotary type, will have a rated capacity of two million gallons per day, and will be capable of causing the wash water to rise through the sand at the rate of 12 inches per minute. If a greater rate of washing is desired, one of the low service pumps is to be so arranged that it can also pump filtered water into the wash water system. Furthermore, the high pressure mains can be drawn upon for this purpose. The air blower is to have a capacity of 3 cubic feet of air per square foot per minute.

Preliminary Treatment. The raw water as it passes through the low service pumps will receive by gravity a supply of alum solution which will be automatically controlled by devices located in the new building. The water will then pass to the coagulating basins which are two in number, each 15 feet by 60 feet by 11 feet and having a total capacity of 143,000 gallons, approximately $7\frac{1}{2}$ hours with the present consumption, or two and one-half hours flow when the plant is being operated at its rated capacity. The basins will be baffled. The settled and coagulated water will pass through open channels on to the surface of the filters, the normal level of the water over the sand being practically the same as that in the coagulating basins.

Filters. The filters are of the rectangular reinforced concrete box type, each being 20 feet by 9 feet interior dimensions and having, on the basis of a rate of filtration of 125 million gallons per acre per day, a nominal capacity of 500,000 gallons per twenty-four hours. The strainer system consists of one 8-inch cast iron pipe 20 feet long, placed in the center of each filter from which, at intervals of 10 inches, branch at right angles 2-inch galvanized iron lateral pipes which are to be enclosed in the concrete floor. In the lateral pipes are inserted brass strainers at intervals of 6 inches. Six inches above the strainer system is located the air system which consists of two 3-inch mains with brass laterals located 4 inches center to center. The size and design of brass strainers and brass laterals is left to the contractor, who will be obliged to demonstrate that same are efficient.

In a similar manner the contractor is to be held responsible for many of the details of the general piping system. The specifications on this subject, although fairly comprehensive, state that "in general, the piping must be of such size and dimensions as are suited for the purpose which it is to serve." The design of controllers is left to the contractor. They must be capable of operating at a rate of 500,000 gallons per twenty-four hours and be capable of adjustment to a minimum rate of 250,000 gallons and a maximum rate of 750,000 gallons per twenty-four hours. They must control within five percent of the desired rate.

The specifications describe what will be required in regard to gages and coagulant devices although no detailed plans of these have been made. Speaking briefly, the coagulant devices are to consist of two dis-

solving and storage tanks and one orifice box together with the necessary piping, valves, and orifices. The storage tanks are to be constructed of cypress and are to be 5 feet in diameter and 6 feet high. The orifice tank will be 18 inches by 30 inches in plan and 24 inches high. All metal parts will be acid proof.

Filtering Material. The following specifications cover the quality and amount of the filter sand and gravel:

"Around and over the strainer system in each filter will be placed nine inches of quartz gravel. This will be graduated in size from one inch to one-eighth inch in diameter and will be deposited in layers of approved thickness. The specific gravity of this gravel must not be less than two and sixty-three one-hundredths (2.63). Gravel shall not contain more than one per cent. of calcium oxide, magnesium oxide, mica, slate, coal and other foreign mineral compounds, measured collectively. The gravel must be carefully and thoroughly washed before being placed in the filters.

"Each filter will be filled to the depth of thirty (30) inches with an approved sand. The effective size of the sand shall not be less than 0.35 m. m. nor more than 0.40 m. m. The uniformity coefficient shall not be more than 1.5. The specific gravity shall not exceed 2.63. The sand shall be practically pure quartz and shall not contain more than one and one-half ($1\frac{1}{2}$) per cent of calcium oxide, magnesium oxide, mica, slate, coal and other foreign mineral compounds measured collectively. It shall be carefully and thoroughly washed before being placed in the filters. After the filters are in operation, the sand layers will be thoroughly washed and skimmed by removing the top one inch of sand. If required, this operation will be repeated three times."

Storage of Filtered Water. Underneath the filters is a clear well having a capacity of 70,000 gallons, and in the park outside of the plant is to be located a circular filtered water basin 42 feet in diameter and 16 feet deep, having a capacity of 190,000 gallons. There will be provided, therefore, a total storage capacity of 260,000 gallons.

Alternative Plan for Filters. The specifications in regard to piping and strainers are not entirely definite, but rather hold the contractor responsible for certain details. Furthermore, under Article 5 of the specifications, each bidder is permitted, if he so chooses, to submit plans of entirely his own design for the filter equipment, including all piping, valves, controllers, gages, and coagulant devices. In case this is done, the bidder must also submit a guarantee covering the efficiency of the plant, which is to be determined after a sixty days test under the direction of a superintendent to be furnished by the contractor and under the inspection of an expert to be selected by the local officials and approved by the State Board of Health. In case the first sixty days test is unsatisfactory, another test of the same duration shall be made; and in case the second test is also unsatisfactory, the filter equipment without being paid for shall be removed by the contractor at his own expense.

September 21st, 1910, these plans for a mechanical filter plant to purify the existing water supply of Port Clinton, as shown on drawings

and described in specifications submitted by Mr. Clark on September 10th, were approved provided:

1st. That plans showing all details of piping and strainer system, controllers and coagulant devices, as these are to be actually installed, be submitted to and receive the approval of the State Board of Health before the contract for the work is awarded;

2nd. That in case the contractor's plans for the filter equipment are adopted by the local authorities in accordance with Article 5 of the specifications, the contractor's guarantee shall be submitted to and receive the approval of the State Board of Health before the contract is awarded.

3rd. That any test which may be carried out in order to ascertain the efficiency of the filter plant before its acceptance, be made to cover a period when the lake water contains the maximum amount of turbidity;

4th. That the size of the coagulating basins be enlarged whenever in the opinion of the State Board of Health the increased water consumption of the village warrants such enlargement; and,

5th. That this approval be valid only until January 1st, 1912.

The authorities were notified that while good results could be obtained by the present plant, with proper operation, it would be desirable to extend the present intake into deep water beyond the direct influence of the Portage River, in order that there might be obtained a water which could be more easily and economically purified.

REPORT ON PROPOSED NEW WATER SUPPLY FOR SHREVE.

On March 14th, 1910, a communication was received from Mr. James H. Andress, health officer of Shreve, stating that it was the purpose of the village to use as an additional source of public water supply a spring known as Stout Spring. On March 23rd, 1910, a representative of the engineering department visited Shreve for the purpose of making an investigation of the project. While in Shreve the Board's representative learned of the availability of Sheard Spring, and accordingly both of these sources were examined and are considered in the following report:

The village of Shreve is located in the southwestern portion of Wayne County in the valley of Shreve Run, a small stream which flows in a general easterly direction just south of the village. The present population is said to be in the neighborhood of 1200. The village is primarily a farming center and has no manufacturing industry of any importance. The surrounding country is rather hilly, but the topography within the village is fairly level. The drift deposits are principally clay and gravel and are usually found in thicknesses ranging from a few feet

to nearly 200 feet, the greater thicknesses occurring in the valleys. The bed rock below is a brown, sandy shale, which belongs to the upper layers of the Waverly group.

PAST INVESTIGATIONS AND ACTIONS OF THE STATE BOARD OF HEALTH.

The public water supply of Shreve was first installed in 1893, when a deep well was drilled in the built-up portion of the village. In 1899 the supply proved inadequate and a new source of supply was sought, which resulted in a request for approval of Stout Spring, located about one-half mile southwest of the village near the tracks of the Pennsylvania Railroad. As a result of an investigation made by a member of the Board, the State Board of Health voted to approve the supply on August 17th, 1899. Owing to lack of funds or some other reason, this supply was never developed and the wells continued to be used as the sole source of supply.

In 1902 the matter of seeking a new supply was again agitated and approval was requested for the use of Sheard Spring, located about one-half mile in a northeasterly direction from the village, a short distance north of the Pennsylvania Railroad tracks. As a result of the investigation made by the engineer of the Board, the use of Sheard Spring as a source of public water supply was approved June 14th, 1902. Later in the same year, before developing Sheard Spring, the public supply well was deepened by 34 feet, which greatly increased its yield. The Sheard Spring project was therefore abandoned. No changes in the water supply have been made subsequent to this time and the well at present furnishes the sole source.

On May 24th, 1909, an examination was made by a representative of the engineering department, with a view to determining the source from which the well derives its supply. It was found that the water reaches the well from at least two strata, one of which is near the surface and the other deep seated. It was also shown that the water near the surface was polluted by surrounding privies and cesspools and was rendered unsatisfactory for a public supply. In a letter to the mayor and council, attention was called to this condition and it was urged that the well be recased in order to keep out the water from the upper stratum, and that the sources of pollution within a radius of at least 500 feet be removed. After careful consideration of the matter, the village has decided that the most satisfactory and economical remedy will be the installation of a new supply. It is therefore proposed to abandon the well entirely and secure a new supply from either Stout Spring or Sheard Spring.

Stout Spring. Stout Spring is located about one-half mile in a southwesterly direction from the village in the valley of Shreve Run, which at this point flows in a southerly direction. The spring issues from the base of a precipitous slope which forms the east bank of the

stream. The slope is about 25 feet in height and a section shows it to be composed of brown, sandy shale. The spring is at a safe elevation above the high water mark of the creek. Under ordinary weather conditions it is said that the water is always of satisfactory appearance, but during wet weather the water becomes turbid. The spring is well removed from visible sources of pollution, the nearest dwelling being in an easterly direction about 300 feet distant. The possibility of future growth of the village in a direction toward the spring, however, should be noted.

By rough measurement, the yield of the spring was found to be 18,000 gallons per day. This, however, represents about half the quantity available if the spring were properly developed. In the development of this supply it is planned to construct a conduit following the valley of the creek to the southerly portion of the village, where a concrete reservoir and pumping station may be located. Minor extensions of the mains will complete the improvement.

The water from the spring is during winter months conducted in a small race to a mill located near the site proposed for the location of the pumping station. An ice pond has been constructed here to receive the water from the race. The use of Stout Spring as a source of public water supply would necessitate the use of raw creek water for the ice supply at the spring could not be expected to furnish a sufficient quantity for both uses. This is an objectionable feature inasmuch as the creek becomes very turbid during winter months. The ice company is said to hold a mill right on the use of the race fed by the spring, and it is thought locally that this may cause difficulty in securing the use of Stout Spring as a source of public water supply.

Sheard Spring. Sheard Spring is located about one-half mile northeast of the village. It issues from the foot of a high hill which separates the spring from the village. The formation of the hill could not be determined, but it is presumably largely drift deposit. The only dwelling within 1000 feet is a farm house, located about 200 feet southeast of the spring. Since the flow toward the spring comes from a westerly direction, the presence of this farm house is not objectionable. The likelihood of future growth between the village and the spring is very slight owing to the objectionable topography for building purposes.

The yield of the spring was measured roughly to be 16,000 gallons per day, and a rough measurement in a small stream formed by the spring indicated a flow of about 45,000 gallons per day, which could be secured if properly developed. It was stated locally that the flow of the spring fluctuates but slightly, and that the spring is not affected by wet or dry seasons. The water never becomes turbid under any conditions. In the development of this supply it would be necessary to locate a reservoir and pumping station near the spring. An addition of about 1000 feet of mains would have to be made to connect with the present distribution system.

Quality of Water. Samples of water from Stout Spring have been collected on two occasions, namely, August, 1899, and March 23rd, 1910. Samples have been collected from Sheard Spring on June 3rd, 1902, and March 23rd, 1910. The analyses of the Stout Spring water indicate it to be of satisfactory quality from a sanitary point of view. The turbidity and sediment present in the sample collected in August, 1899, were caused by a hard rain, which occurred a short time before the collection of the sample. The analyses of samples from Sheard Spring also indicate a water of satisfactory quality. Its hardness is somewhat higher than that of Stout Spring but is not excessive. Its use for domestic purposes should be satisfactory.

Quantity of Water. Previous investigations by the engineering department of the State Board of Health have indicated that the consumption of water at Shreve is exceedingly small. The total quantity consumed daily for general domestic purposes will probably not exceed 10,000 gallons. This is largely explainable by the fact that the village has as yet no system of sewers, and therefore modern plumbing has been installed to but a very limited extent. Furthermore, many families in Shreve still depend on private wells for their water supply. It will therefore appear that while neither of the proposed new sources of supply has a large yield, yet either alone would be sufficient to easily meet the present requirements of the village. It may be objected, however, that the sources of supply proposed would not permit of adequate fire protection, but this difficulty is in large measure overcome by the presence of a storage reservoir on the distribution system which holds approximately 80,000 gallons. When it is considered that most of the buildings in the village are small and to a large extent isolated, it will be seen that the fire risk is not excessively great.

May 17th, 1910, the State Board of Health approved of Stout Spring and Sheard Spring as new sources of water supply for the village of Shreve subject to the following conditions:

- 1st. That the village obtain by purchase or otherwise control over any land on the watershed within 300 feet of either spring in order that no habitations or other sources of possible contamination of the springs may be located within this area;

- 2nd. That before any contracts are let for the development of either spring, complete detailed plans and specifications showing the method of collecting the flow of the springs, protecting the waters thereof and conveying same to the village, be submitted to and receive the approval of the State Board of Health;

- 3rd. That the existing supply, consisting of a drilled well near the corner of Robinson and Main streets, be abandoned as a source of water supply; and,

- 4th. That this approval be considered void unless the sources of

supply herein referred to are placed in service on or before January 1st, 1912.

In accordance with the second condition of approval, plans for the development of Sheard Spring were submitted July 19th, 1910, by Mr. O. B. Parsons, engineer for the village. In a letter to the board of trustees of public affairs, dated July 30th, 1910, these plans were informally approved pending the submission of more detailed plans, and a letter was sent to Mr. Parsons on August 6th, 1910, outlining in a general way the proper method of development of the spring. September 1st, 1910, a second set of plans and specifications for the development of Sheard Spring were submitted by Mr. Parsons. These plans were examined by the engineering department and the following report was submitted:

The plans received on September 1st, 1910, comprise four sheets of drawings. These consist of a plan, section, and elevations, giving details of the development of the spring and the construction of a reservoir and pumping station. Briefly stated, the new water works will consist of Sheard Spring developed as a source of supply; a collecting reservoir which will also act as a pump well, and a pumping station. The pumping station is to be built directly over the reservoir and both are to be located at the spring. The new supply will be connected to the present distribution system by the addition of about 1000 feet of pipe.

Spring. Sheard Spring is located about $\frac{1}{2}$ mile north east of the village. It issues from the foot of a high hill which separates the spring from the village. The hill is made up of drift deposits which overlie the bed rock. The yield of the spring by proper development may be maintained at about 45,000 gallons per day. The fluctuation of the flow is slight and is not noticeably affected by wet and dry seasons. Plans for the development include excavating to the bed rock about 20 feet into the hill. Along the face of this excavation is to be placed a wall or curbing extending from the bed rock to about one foot above the surface of the ground. The lower portion of this wall is to be built of brick laid in cement mortar, one-inch openings being left between the bricks of each course. The upper portion of the wall is to be built of concrete. This curbing is to extend along the south and west sides of the collecting reservoir, the walls of which are to be $2\frac{1}{2}$ feet from the curbing. The opening between the curbing and the reservoir will be covered with concrete slabs. An overflow is provided to be used in case of emergency. The overflow is located at a point $2\frac{1}{2}$ feet above the bed rock.

Reservoir. The reservoir is to be built with a rectangular plan. Its dimensions are 29 by 14 feet by 7 feet deep to the overflow, and its capacity 21,000 gallons. The floor, walls and roof are of concrete, 6 inches in thickness. The bottom of the reservoir will be about $5\frac{1}{2}$ feet below the top of the bed rock. If the water is to be allowed to flow freely from the spring, therefore, the reservoir provides a capacity of but

17,500 gallons. Only one inlet from the spring is shown on the plans. This is located in the south wall about 18 inches above the bed rock. Other inlets should be placed in the west wall of the reservoir. The position of the inlet makes it necessary for the water to back up to a depth of 18 inches before it enters the reservoir and prevents a free flow from the spring. The inlets should all be placed at or near the level of the bed rock.

Pumping Station. The pumping station is to be located upon the roof of the reservoir, which will also act as the floor of the building. It is to be constructed entirely of concrete and will be partially under ground, as the floor is but 2 feet above the level of the bed rock. The pumping machinery is not shown on the plans, but will probably consist of a power pump driven by a gasoline engine. It should be noted that this type of machinery will introduce excessive vibration and the roof of the reservoir will be subject to strain.

EXAMINATION OF WATER FROM SHREVE.

PARTS PER MILLION.

Sample Number	Collected	Color	Turbidity	Sediment	Odor	Oxygen Required	Nitrogen as			
							Albuminoid Ammonia	Free Ammonia	Nitrites	Nitrates
548	Aug. '99	0.13	disct.	v. slt.	none	1.56	0.006	0.024	2.01	none
9376	Mar. 23, '10	trace	none	none	none	0.35	0.016	0.006	none	2.4
2241	June 3, '02	5	none	none	none	0.10	0.014	0.034	none	2.60
9377	Mar. 23, '10	trace	none	none	none	0.10	0.004	0.006	none	4.0

Sample Number	Chlorine	Alkalinity	Incrustants	Sulphates	Residue on Evaporation		Iron	Bacteria	
					Total	Loss on Ignition		Number per cc.	Colon Present
548	3.5	169.2	8.0		308	118			
9376	5.0	148.0	15.0		204	33	trace	45	Not in 10 cc.
2241	3.6	174.0	41.0		276	51	0.1	140	no
9377	8.0	176.0	32.5		277	51	trace	10	Not in 10 cc.

Source of Samples.

No. 548. Stout Spring. Sample submitted preliminary to the approval of Stout Spring as an additional source of public water supply. This sample was

collected soon after a hard rain, which accounts for the presence of turbidity and sediment.

No. 9376. Stout Spring. Sample collected by W. H. Dittoe.

No. 2241. Sheard Spring. This sample was collected preliminary to the approval of Sheard Spring as an additional source of water supply.

No. 9377. Sheard Spring. Sample collected by W. H. Dittoe.

At a meeting of the State Board of Health held October 20th, 1910, these plans submitted by Mr. Parsons on September 1st, 1910, for the development of Sheard Spring as a new water supply for Shreve were approved upon the condition that there be provided three inlets from the spring into the collecting reservoir, the said inlets to be placed at or just above the bottom of the spring.

The engineer was informed that the Board was of the opinion that his plan of placing a heavy pumping engine on the roof of the collecting reservoir was not in accordance with the safest practice, and that it would be better to provide a more solid foundation for the machinery.

REPORT ON PROPOSED WATER SUPPLY FOR WAVERLY.

At a meeting of the State Board of Health held July 27th, 1910, the following report was submitted:

On May 12th, 1910, request was made by Mr. E. P. P. Smith, clerk of the village of Waverly, for approval of a proposed site for water works wells for that village. A representative of the engineering department inspected the locality on May 16th, and based on his report a letter was sent to the mayor and council of Waverly advising them that the proposed site was not favorable for securing continuously a safe and satisfactory supply of water. Although the soil at the proposed site is of a gravelly nature, it was believed that the relative proximity of the wells to the village and the many leaching cess pools therein would result sooner or later in the contamination of the well water. The local authorities were further advised that a short distance eastward of the village was a broad gravelly plain remote from habitations, which would probably yield water satisfactory in quality and quantity. It was stated, however, that if the local authorities insisted in continuing the sinking of the well on the proposed site which they desired to use, the State Board of Health would send a representative to collect samples after a thorough pumping test had been made.

On July 17th, 1910, the sinking of the well on the site proposed by the village having been completed, a three days' pumping test was commenced, and on July 20th a representative of the Board collected samples from the test well and secured data in regard to the character of the formation pierced and the amount of water derived. The formations encountered in drilling are as follows:

Surface soil	6 feet.
Fine gravel and sand	4 feet.
Gray sand	40 feet.
Fine gravel	10 feet.

Below the lower gravel a hard impervious clay stratum was struck, and the well was drilled into this one foot. The water stands normally at a point 4 feet below the surface, and the well is cased with 6-inch cast iron pipe casing throughout its depth. The pumping test was made by means of a temporary air lift. The water was measured over a weir and the observations showed that over 100 gallons per minute were being secured.

The well is located about 325 feet south of the electric light power house, the proximity to which was the reason that the village desired to use the site, as it was believed that one set of engineers could operate both the electric light machinery and the pumping machinery. The site lies west of Crooked Creek and near the edge of the village. The land is low and subject to flood during the spring. The thickly built up portion of the village lies about 400 feet away in an easterly direction, and there are four or five houses within less distance of the well.

EXAMINATION OF WATER FROM WAVERLY.

PARTS PER MILLION.

Sample Number	Collected	Color	Turbidity	Sediment	Odor	Oxygen Required	Nitrogen as			
							Albuminoid Ammonia	Free Ammonia	Nitrites	Nitrates
9590	1910 July 20	2	25	slight	ft earthy	0.25	.048	.346	0	0

Sample Number	Chlorine	Alkalinity	Incrustants	Sulphates	Residue on Evaporation		Iron	Bacteria	
					Total	Loss on Ignition		Number per cc.	Colon Present
9590	18	330	75		586	56	2.5	3	Neg. in 10 cc.

Source of Sample.

Proposed public supply well, located west of Crooked Creek and near built up portion of village.

The analysis of the water shows it to be satisfactory from a bacterial standpoint but unsatisfactory as regards turbidity, odor, and iron. The turbidity might disappear on further pumping. The iron, however, which appears in a quantity of 2.5 part per million, would be a most objectionable characteristic for domestic as well as manufacturing purposes. Nitrites and nitrates were absent in the sample, but in view of the high free ammonia, this may have been due to a reduction by the large amount of iron. The chlorine, while it should not perhaps be viewed with much importance, is considerably higher than occurs in waters from uncontaminated wells situated in the Scioto and Miami River valleys.

After hearing the report, the Board decided to postpone definite action and the matter was referred to a committee consisting of Dr. Frank Warner, member, and the chief engineer. Shortly after the meeting, Dr. Warner visited Waverly and inspected the site for the proposed well. Following his visit, on recommendation of the committee, the Secretary wrote the following letter to the mayor and council of Waverly:

"COLUMBUS, OHIO, August 11th, 1910.

Mayor and Council, Waverly, Ohio:

DEAR SIRS:—The analysis of water collected on July 20th from your proposed test well has been completed. The results show that the water is unsuitable chemically for a public supply. This is due not only to the large amount of iron contained therein, but also to certain indications of organic contamination.

As previously suggested to you, we think it would be the wiser for you to locate your water works wells near the easterly boundary of the village and safely removed from possible sources of contamination. This would not necessitate an additional power plant, as some of your officials seem to think. An electric pump could be located at the wells and the power for same could be generated at your present electric light station. About three-fourths of a mile of transmission wire would be sufficient to convey the current from your power plant to the wells. The electric pump need not be visited more than once a day and would not necessitate the employment of an extra engineer. Furthermore, by constructing a reservoir of ample size on the hill west of the village, it is probable that pumping will be necessary only every two or three days until the village gets to be larger.

The westerly location near the electric plant, which you propose to use is not satisfactory, and we doubt whether you can procure from same any better water than that already sampled. We trust, therefore, that you will take steps toward modifying your water works plans along the line suggested above. We should be glad to be of assistance any time to you in this matter.

Yours truly,

(Signed) C. O. PROBST, *Secretary.*"

The village officials, however, were much opposed to locating the wells elsewhere than in the first proposed location near the electric light station, especially as they were informed, in reply to a communication, that the well water which they decided to use could be rendered satisfactory by treatment in an iron removal plant. Another well was sunk 50

feet from the first one and 63 feet deep. Analysis of a sample of water from this well showed that the water is considerably harder than the water from the first well and that it contained an abnormal amount of iron. The amount of iron in the second sample was slightly less than that in the first but still objectionable.

The local authorities submitted plans showing the location of the wells, pumping station, distribution mains and standpipe for the installation, of which the contract had already been let. They proposed to install a mechanical filtration plant to remove the iron from the well water, and also to soften the same. Plans for this plant to be submitted later. As they desired to proceed with the construction work, approval of the wells was requested with the understanding that the water should be treated for the removal of iron.

At a meeting held October 20th, 1910, the State Board of Health approved the wells located on land south of the electric light power house and west of Crooked Creek at the edge of the village of Waverly provided a purification plant of a design satisfactory to the State Board of Health be installed and placed in operation before the water is offered to the consumers.

The attention of the local authorities was called to the letter addressed to the mayor and council under date of August 11th, 1910, above quoted, and to state that the importance of following that advice had been recently emphasized by the fact that an analysis of a well located near the Norfolk & Western Railroad station, about one mile east of the center of the village, had shown a water which contained very little iron and in all respects superior to the water in the proposed wells; that if there could be obtained a sufficient supply of water of the quality shown by the analysis of the Norfolk & Western well, such water would be satisfactory without any treatment and the village would be saved the expense necessary for the installation and maintenance of a purification plant, such as they proposed.

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REPORT ON PROPOSED CHANGE OF MAIN SEWER OUTLET AT AKRON.

On June 20th, 1910, Mr. E. G. Bradbury, consulting engineer for the city of Akron, presented plans for an extension of the existing main sewer outlet for that city. These plans were referred to the engineering department and were reported on as follows:

Akron at the present time has an estimated population of 75,000. It is an important manufacturing city and is growing rapidly. It lies just to the north of the Great Divide and in the valley of the Little Cuyahoga River. The neighboring topography is rough, and most of the city is built on hilly ground. The area within the corporation limits is about 11.67 square miles, but the greater portion of this is only sparsely built up.

The first sewers of Akron were built in 1880 in accordance with general plans worked out by Mr. O. N. Gardner, then city engineer. The system has been added to from time to time as requirements indicated. The main business portion of the city is served by combined sewers, whereas all of the outlying districts are sewerred on the separate plan. All but one of the sanitary sewers discharge into a 42-inch circular brick intercepting sewer which conducts the sewage to a point at the northern edge of the thickly built up portion of the city and a few hundred feet below Ravine Street on the Little Cuyahoga River. Nearly opposite the outlet of the 42-inch intercepting sewer is a small 18-inch vitrified pipe sewer which at the present time runs very nearly full. Storm water is permitted to flow directly into the Little Cuyahoga River at a number of points through relief overflows.

During the past year suit was brought against the city of Akron for creating a nuisance by the discharge of unpurified sewage into the Little Cuyahoga River. It was claimed that this nuisance tended greatly to decrease the value of property in the vicinity of the outlet. The court in deciding upon the case, awarded merely nominal damages to the complainants but enjoined the city of Akron from discharging unpurified sewage into the river after December 14, 1910. Accordingly, the city has taken steps toward improving its sewerage conditions and proposes to build a trunk sewer several miles long which will convey all of the sanitary sewage of the city to point near the confluence of the Little Cuyahoga River with the main stream and about two miles below the present outlet. A strip of land lying at the convergence of the two streams has been optioned by the city for sewage purification purposes.

The funds now available for carrying out the proposed work, without submitting the matter to a vote of the people, are not sufficient to cover both the construction of the trunk sewer and the purification works, but are sufficient to cover the cost of the trunk sewer alone. For the

purpose of confining themselves within the city's financial means and also to do away at the earliest possible date with the objectionable nuisance now being created by the discharge of crude sewage into the stream at the present outlet, the city authorities desire the approval of the State Board of Health for the construction of the trunk sewer with a temporary outlet into the Little Cuyahoga River just above its confluence with the main stream. It is the intention of council to construct the purification works with funds that will be available during next year and possibly the following year.

The proposed sewer will be a large reinforced concrete conduit, which owing to the impracticability of obtaining an even gradient will along portions of its length be under some pressure. The total capacity of the conduit will be 100 cubic feet per second, or 64,500,000 gallons per twenty-four hours. This capacity is sufficient to meet all requirements of the city of Akron for a great number of years to come. The present sewage flow is unusually large for the population tributary to the sewers, which may be ascribed to the liberal use of water by certain manufacturing establishments and to a rather large ground water leakage. Recent measurements made by the consulting engineer indicate an average daily flow of about 12,600,000 gallons, which is in contrast to the daily water consumption which does not exceed 7,000,000 gallons per twenty-four hours. The fluctuation of the sewage flow during the day is comparatively slight since many of the manufacturing establishments operate throughout the twenty-four hours and the ground water leakage is of course unchanged. The average day flow is about 13,150,000 gallons, and the average night flow is about 12,000,000 gallons.

It must be understood that permission to construct this extension of the outfall sewer will have the effect merely of transferring the nuisance to a point farther downstream, and probably the nuisance will be materially increased for the reason that the proposed sewer outlet will enter the stream at a point below the canal feeder which diverts a considerable portion of the flow into the canal. On the other hand, there are few houses in the vicinity of the proposed new outlet, and it is not likely that the same vigorous complaint against the discharge of crude sewage into the stream will be made as at present. In this circumstance lies the danger that should the trunk sewer be constructed before the purification works are begun, the latter will not be constructed in the following year as now contemplated; and it is a matter of experience that when there is no immediate demand for the abatement of a nuisance caused by the discharge of sewage into a stream, it is difficult to obtain an enforcement of any order of the State Board of Health requiring purification.

Again, the construction of the purification works is by far a larger problem than is the construction of the trunk sewer and in all probability will require a longer period for its completion. It would there-

fore seem advisable to require the city to devote present funds to the construction of purification works and leave the construction of the trunk sewer for following years. If such a course is pursued, there will be no loss of economy, and with a purification plant in readiness there will in all probability be little time lost in extending present sewers to reach it.

At a meeting of the State Board of Health held June 29th, 1910, the question of approving an outlet for this trunk sewer to be discharged into Little Cuyahoga River about two miles below the present sewer outlets was considered. Representatives from the city of Akron appeared before the Board and stated that options had been secured and money appropriated for the purchase of about fifty acres of land upon which to locate a sewage disposal plant. Mr. Bradbury, the consulting engineer, stated that an unusually large flow of sewage had been found in the city of Akron which was probably of a very dilute character and that some experimentation would be advisable to determine the best method for its purification.

The Board approved the proposed outlet and gave the city of Akron six months time in which to submit to the State Board of Health some definite method for disposing of its sewage, with the understanding that if such method were approved by the Board the city of Akron would furnish, without delay, plans for a sewage disposal plant.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR AMHERST.

On June 6th, 1910, there was received from Mr. L. E. Chapin, consulting engineer for the village of Amherst, a set of plans showing a system of sewerage and sewage purification works for that village. The submitting of these plans was preceded by some informal correspondence with the engineering department relative to the selection of a site for purification works, and by a visit to Amherst by one of the assistant engineers. The following report was submitted:

Amherst is a village of about 2,000 population and is located in Lorain County on Beaver Creek, a small stream which flows in a northerly direction through the built up portion of the village and ultimately discharges into Lake Erie about three miles distant. The topography of the village and surrounding country may be described as gently undulating. Watercourses in the vicinity, however, have carved shallow valleys with rather precipitous slopes. The geological formation in the vicinity of Amherst consists of strata of hard blue shale covered with thin layers of drift deposits. About three miles to the southward of

the village the shale is covered with Berea sandstone which outcrops at this point and is extensively quarried.

Amherst is primarily a farming center and has no manufacturing industries, except a small nut and bolt works. A large part of the population finds employment at Lorain and at the stone quarries to the southward. It is therefore apparent that the sewage from that village will be entirely domestic in character.

With the exception of a municipal electric lighting plant, the village has no civic improvements such as paved streets, water works, sewerage, etc. Negotiations for the introduction of a public water supply are now in progress, and it is likely that within a year or so water will be obtained from Elyria and distributed to the consumers through a system of piping owned and cared for by a private company. It is the expectation that all service connections will be metered, thereby maintaining the water consumption at a minimum. This will undoubtedly have an effect on the quantity of sewage produced, and it is the opinion of the consulting engineer that disregarding ground water leakage there will not be a greater quantity of sewage than 50 gallons per day per person tributary to the sewerage system.

PREVIOUS ACTIONS AND INVESTIGATIONS OF THE STATE BOARD OF HEALTH RELATIVE TO SEWERAGE AT AMHERST.

The sewerage problem at Amherst was first brought to the attention of the State Board of Health in November, 1905, through a complaint filed by the then health officer, Dr. W. Foster. On December 5th of that year, the engineer of the Board visited Amherst for the purpose of investigating conditions. It was learned during this investigation that probably in the year 1902 there was constructed an 18-inch sewer about 1,000 feet long, in Elyria Street. This sewer was entirely the result of private enterprise and was placed primarily for the purpose of caring for storm water and cellar drainage. At the time the sewer was laid, there was connected with it an old storm water sewer in Cleveland Street. The outlet of this system of sewers is near the Milan Street bridge. After the sewers had been in use for a short period, it was found convenient by a number of persons living in Cleveland and Elyria streets to make connections thereto for sanitary purposes. It thus resulted that the flow from the outfall of the sewer became a gross nuisance. Finally it was noted that the installation of the sewer had been carried out without the knowledge or approval of the State Board of Health and therefore was in existence contrary to law.

December 20th, 1905, the State Board of Health disapproved the outlet of this sewer, and the board of trustees of public affairs was notified that the discharge of unpurified sewage into Beaver Creek should cease by September 1st, 1906. This order of the Board was not complied with.

On October 22nd, 1907, one of the assistant engineers of the Board visited Amherst for the purpose of investigating, in connection with other matters, the status of the sewerage of the village. At this time it was found that in addition to the sewers described, two more so-called storm sewers had been constructed with outlet into Beaver Creek, and these also were receiving more or less sanitary wastes. As a result of this investigation, a communication from the State Board of Health was sent to the village authorities urging that immediate steps be taken to provide a suitable sewerage system together with sewage purification works.

It is in compliance with this action of the State Board of Health that the village has engaged the services of a consulting engineer and submits for the approval of the Board the plans which form the basis of this report.

SEWERAGE SYSTEM.

The proposed sewerage system is to be constructed strictly on the separate plan. It will receive domestic wastes and cellar drainage, but not subsurface drainage, roof water, or storm water. The total length of sewers contemplated for immediate installation consists of the following:

8-inch steel pipe	0.11 mile.
12-inch sewer	0.48 mile.
10-inch sewer	7.26 mile.
8-inch sewer	7.26 mile.
Total	8.11 miles.

The sewage from the portions of the village lying on either side of Beaver Creek will be collected in what are essentially two separate systems. Each of these systems will have a trunk sewer leading to the northward, and these will unite at the site of the purification works. The construction of the system of sewers will be carried out along standard lines, and apparently no unusual difficulties will be encountered. It is not anticipated that much ground water will be found in the sewer trenches, but if it is found it will be cared for by suitable underdrains. Perhaps the most unusual feature of the system is the use of about 500 feet of 8-inch steel pipe, supported on concrete piers and constituting the creek crossing at the terminus of the east side 12-inch trunk sewer.

SEWAGE PURIFICATION WORKS.

Site. The site selected for purification works is a 6-acre tract of land about 1,000 feet north of the north corporation line and on the west side of Beaver Creek. It is well removed from habitations, the nearest dwelling being fully 600 feet distant and to the eastward. It is on the whole the most favorable of four sites originally contemplated, more

particularly as regards its accessibility and distance from dwellings and the built up portion of the village. The selection of this site was prompted by informal advice given by the engineering department of the State Board of Health.

Quantity and Character of Sewage to be Treated. As already noted, the per capita water consumption will not be large and so the per capita sewage flow will be moderate in quantity unless complications arise due to ground water leakage. It is not anticipated that more than 200 dwellings will be connected with the village sewers within three years after their completion. From experience in other small rural communities of the state, this would appear to be a conservative estimate. Indeed it is questionable whether this number will be connected before five or ten years. It may be assumed that the above mentioned number of connections represent about 1,000 people, or half of the present estimated population. This being the case, there will probably result a sewage flow of about 50,000 gallons per twenty-four hours. In discussing the plans, therefore, a nominal capacity may be assumed of 1,000 persons tributary to the sewers and an average daily sewage flow of 50,000 gallons.

General Features. The system of sewage purification adopted is primary sedimentation followed by intermittent sand filtration. The plant as shown on plans comprises a screen chamber; two sedimentation tanks; a dosing basin, including automatic dosing apparatus; and three sand filters.

Sedimentation Tanks. The two sedimentation tanks are each 44 feet long and 9 feet in average depth to the flow line. One of the tanks has a width of 13 feet, while the other has a width of 7 feet; thus the capacity of the first is about 38,500 gallons, and the capacity of the second is about 20,700 gallons, representing a total capacity of 59,200 gallons, or a period of flow of somewhat over twenty-eight hours. The object of making the tanks of unequal size is to permit of using different sedimentation periods and to provide a small tank to be used for the first few years during which it is not likely that many house connections will be made.

The details of design of the tanks are in a general way satisfactory. A liberal slope of the bottom is provided from outlet end to inlet end, and at the low point within a sump is placed a pipe outlet for sludge drainage.

Provision is made for producing an even inflow across the width of the tanks by three 12-inch by 12-inch openings spaced equidistantly across the inlet ends of each. At the outlet ends an even outflow is provided by two weirs in each tank, each weir being 24 inches long. Near the inlet and outlet ends are placed hanging baffles for the purpose of confining scum formation.

The covering for the tanks will consist of planks battened together

in sections to facilitate removal. While this covering is crude, it will serve the purpose of keeping down odors and will also permit of ready accessibility.

Dosing Basin. The dosing basin is a covered reservoir formed in earth excavation and lined with a single layer of brick. The sides have a slope of one to one, and the depth to the flow line is about 4 feet nine inches. The total capacity of the basin is approximately 20,000 gallons, which is sufficient when spread out upon the surface of one of the sand filters to cover same to a depth of 3 inches. The covering as in the case of the sedimentation tanks will consist of planks battened together in sections so as to facilitate removal.

Adjacent to the dosing basin is a concrete chamber having a slightly greater depth than the dosing basin and 10 feet long by 8 feet wide in plan. Within this chamber will be built a superstructure of wooden construction which will serve as a protection to the dosing apparatus and also as a tool house for the caretaker.

Automatic Dosing Apparatus. The dosing apparatus is to be of the type manufactured by the Pacific Flush Tank Company. It will consist of three siphons arranged so as to automatically discharge in rotation. Each siphon will discharge upon one of the sand filters. The size of the siphons is such that the dosing basin will be emptied in twenty minutes to half an hour. The apparatus is one that has been in successful use elsewhere and should prove satisfactory.

Intermittent Sand Filters. The plans show three intermittent sand filters, each 71 1-2 feet by 150 feet at the sand line. This represents an area for each filter of 10,870 square feet, or approximately 1-4 acre. The total area is therefore 3-4 acre. Based on a population tributary to the sewers of 1,000 persons, this area is somewhat scant and should preferably be one acre. It is exceedingly difficult, however, to foretell in the cases of small villages of this character how generally the sewers will be made use of. It would therefore hardly seem advisable for the State Board of Health to require at the present time the installation of a greater area, although such may be recommended.

It is proposed by the consulting engineer to use as filtering material, 3 feet of lake sand resting on a thin layer of lake gravel. The gravel will have a thickness midway between underdrains of 3 inches and at underdrains a thickness of 9 inches. The varying thickness of gravel is produced by the conformation of the bottoms of the filters so that the upper surface of the gravel is level.

The filters will be enclosed by earth embankments rising to one foot above the surface level. The slope of these embankments is shown on the plans as $1\frac{1}{2}$ to 1 above the sand line and 1 to 1 below the sand line.

A satisfactory underdrainage system is shown on the plans, which consists for each filter of seven transverse lines of 4-inch lateral drains

and one longitudinal center line of 10-inch main drain. The drains will all be made of vitrified pipe laid with open joints.

The sewage will be distributed upon the surface of the sand beds by means of a distributing system consisting of wooden troughs. These troughs will be so designed as to cause the sewage to enter upon the bed at twenty-one points. Adjustable gates will be provided, whereby the discharge at each of these points may be made approximately the same.

Sludge Bed. The sludge bed as shown on the plans is somewhat irregular in shape and has a surface area of 4,000 feet. The contents of the large sedimentation tank would thus cover the sludge bed to a depth of something over one foot.

The filtering material composing the sludge bed will be the same as that used for the intermittent sand filters. Also the construction of the sludge bed will be essentially the same as of the sand filters.

At a meeting held June 29th, 1910, the State Board of Health approved these plans for a system of sewerage and sewage purification works for the village of Amherst, submitted June 6th, 1910, by Mr. L. E. Chapin, consulting engineer, subject to the following conditions:

1st. That contracts for the construction of the sewage purification works be awarded at the same time as contracts for the construction of the sewerage system;

2nd. That samples of all sand and gravel used in filter beds be submitted to the engineer of the State Board of Health before being placed;

3rd. That provision be made for maintaining an accurate and readily accessible record of the number, location, and character of all service connections;

4th. That as soon as the sewerage system is placed in use, there be employed by the village a competent person as superintendent of sewerage and sewage disposal; and,

5th. That this approval be void unless construction is begun on or before January 1st, 1911.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR ANDOVER.

Application having been made for approval by the State Board of Health of sewerage and sewage purification for the village of Andover, the project was investigated by the acting chief engineer and the following report submitted:

The village of Andover is located in the southeastern portion of Ashtabula County and has an estimated population of about 1,000. The growth as indicated by census reports is slow, and it is not likely that

within the next ten or fifteen years the population will be materially increased.

The area within the corporation limits of the village is one square mile, but only a small part of this, say an area of about one-fourth square mile, lies within the built-up portion. The site of the village is on a ridge of land lying between two streams flowing to the southward; namely, Pymatuning Creek, about three miles to the westward, and Shenango Creek, about three miles to the eastward. The drainage from the village, however, is entirely into Shenango Creek by means of a small watercourse known as the south branch of Gravelly Run, which rises within and near the village limits. The topography in and about Andover is what may be termed mildly undulating and its conformation is such that very satisfactory drainage for sewers may be obtained. The geological formation in the vicinity consists of heavy drift deposits, approximately 100 feet in thickness, overlying limestone bed rock. These drift deposits are composed principally of heavy clays and hardpan, though the lower portion contains some gravel strata which are rather abundantly waterbearing, the water being under some artesian pressure.

Andover is altogether a farming and dairy center and has no industries of importance. Transportation facilities are afforded by the Oil City branch of the Lake Shore & Michigan Southern Railway. In general the village presents a neat and clean appearance, though it is very much lacking in modern improvements. It has, however, a few paved streets and extensive and well laid sidewalks, but there are absent what may be considered most essential to the development of communities of this sort, as well as affording improved health conditions, namely, a public water supply and a sewerage system. To the credit of the village, both of these improvements are now being considered. A number of private drains have been in use but these are constructed in a most unsatisfactory manner and discharge into the nearest watercourse or ditch. As a result of this practice, several of the ditches passing through the village have become gross nuisances, much to the annoyance of nearby residents. The nuisances thus created have on several occasions been the subject of complaint to the State Board of Health. The state laws, however, give the State Board of Health no direct supervision over the abatement of nuisances, and it is therefore left to the people and local officials of Andover to find a remedy for the objectionable conditions.

As a preliminary to the installation of an adequate system of sewers, the local officials have engaged the services of Mr. L. E. Chapin, consulting engineer, and have instructed him to prepare preliminary plans and estimates to be submitted to the State Board of Health and to serve as a basis for presenting the matter to the people preparatory to a vote on a bond issue. At the request of and in company with Mr. Chapin, the acting chief engineer of the Board visited Andover on March 10th, 1910, for the purpose of making an examination on the

ground and to confer relative to the general features of the design. Later, on April 7th, 1910, general plans were submitted to the State Board of Health, embodying a sanitary sewerage system and sewage purification works.

SEWERAGE SYSTEM.

Type of System. In view of the fact that purification will be a necessary adjunct to any system that may be installed, and also for general economical reasons, the strictly separate system of sewers has been selected. Sanitary sewers will receive cellar drainage and all domestic wastes, while all subsurface drainage and storm water will be conveyed in storm drains to the nearest watercourse.

General Features. The sanitary sewers will be constructed in accordance with standard methods; that is, vitrified sewer pipe laid with cemented joints will be used throughout. The sewers will be 8 inches and 10 inches in size. Of the 8-inch pipe there will be about 2.84 miles, and of the 10-inch, which constitutes the main outfall sewer, there will be about 0.52 mile. Manholes will be placed at all changes of grade and direction, and flush tanks will be placed at all dead ends. The topography permits of all the sewage being carried by gravity through the valley of the south branch of Gravelly Run to a suitable site for purification works. In view of the fact that the sewage must be purified, special effort will be made to exclude storm and subsurface water. This will be accomplished by the laying of underdrains or other special construction where found necessary. The total cost of the sewers proper will be about \$16,100, of which \$5,500 will be paid by village funds and \$10,600 will be raised by assessment on abutting property.

SEWAGE PURIFICATION WORKS.

Quantity and Character of Sewage. As already noted, the village has had a very slow growth and it is estimated that not over two-thirds of the present population will use the sewers within the next ten years. This estimate agrees fairly well with experience found in other small villages throughout the state. It is therefore fair to assume as a nominal capacity for the purification works the ability to treat the sewage from a population of about 700 persons, amounting on a liberal estimate to a flow of 70,000 gallons per twenty-four hours. The sewage will be entirely domestic in character and will not be complicated by objectionable manufacturing wastes. It may be noted that there is one condensed milk plant in the village which occasions considerable nuisance by the discharge of wastes into a small stream, but it is expected that this plant will be required to treat its own wastes and will not be permitted to make connection with the village sewers.

Site. The site chosen for the purification works lies in the valley of the south branch of Gravelly Run and about one-half mile east of the

eastern corporation line. It is well removed from habitations, being about 600 feet from the two nearest houses; there are probably not more than four or five houses within 1,500 feet. The location of the site is such that the sewage may be carried by gravity to an elevation of about 16 1-2 feet above the ordinary water level of the creek. The creek has so small a watershed that even in severe floods the water level does not rise more than 2 or 3 feet, and at times of the year the stream is practically dry. On the whole it may be said that the site is well selected, and if the operation of the purification works is properly attended to there should result no objectionable odors which will reach habitations in the vicinity.

General Features of Purification Works. The purification works comprise sedimentation tanks, dosing chamber, three intermittent sand filters, and a sludge bed.

Sedimentation Tanks. There are two sedimentation tanks, each 43 feet long, 10 feet wide, and 9 feet average depth to flow line. Each tank, therefore, has a capacity of about 29,000 gallons making, a total combined capacity of 58,000 gallons, representing a period of flow of twenty hours; this is considerably more than will be needed for the present. The excess capacity cannot be considered objectionable, as an increase of the capacity of the entire plant will undoubtedly be required sometime in the future. However, it would be decidedly advantageous to rearrange the size of the units with a view to getting a smaller tank which may be used when the plant is first placed in service. The general features of the design are fairly satisfactory. There is provided at the inlet and outlet ends of the tanks distributing channels for admitting the incoming sewage and drawing off the outgoing sewage evenly across the widths of the tanks. The distribution would undoubtedly be made better by introducing in addition hanging baffles placed a foot or so from the ends of the tanks. Transversely across the middle of each tank is shown a submerged baffle, the object of which is presumably to intercept sludge. A much better arrangement would obtain if such a baffle were placed at two-thirds the distance from inlet to outlet end of a tank and if in addition there were used a hanging baffle a foot or so removed from the submerged baffle. In this way both scum and sludge would be intercepted, and violent ebullition near the outlet end of the tank would in a measure be prevented. The tanks are to be covered with a concrete slab roof, which should prove satisfactory if provision is made for ample accessibility to the interior of the tanks. It has been general experience that some form of superstructure is more satisfactory than a flat roof placed but a few feet above the level of the water.

Dosing Chamber. From the outlet channel of the sedimentation tanks to the dosing chamber will be laid a 6-inch cast iron inverted siphon, which will convey the sewage under the creek. The dosing chamber will be placed at approximately a central position with respect

to the group of three filters and will have the following dimensions: Length, 58 feet; breadth, 12 feet; depth to flow line, 3 feet 9 inches. This gives a capacity of 19,000 gallons, which is sufficient to cover one of the filters to a depth of 3 inches. At one end of the tank will be placed automatic dosing apparatus, the type of which has not yet been decided on. Over this dosing apparatus the plans show a superstructure. The remainder of the tank is shown without cover. A cover would prove a decided advantage, and the superstructure over the dosing apparatus should admit ample light and permit free accessibility to all part of the apparatus.

Intermittent Sand Filters. Each of the intermittent sand filters will have a sand surface of 68 feet in width by 150 feet in length. This is equivalent to 0.233 acre, or a total area for the entire plant of 0.7 acre. Assuming a population tributary to the sewers of 700 persons, there will be afforded a filtering area of one acre per 1,000 persons. The filtering material will consist of 3 feet of sand, presumably obtained from Lake Erie. The exact character of the sand to be used has not been determined on. The plans being general in nature do not show any details as to the arrangement of the bottoms of the filters, the character of the underdrains, etc. In this connection it may be suggested that where filters are artificially built it is always advisable to provide for their free underdrainage by placing a stratum of gravel under the sand of sufficient thickness to completely cover the drain pipe. There should also be some modification of the system for distributing the sewage on the surface of the bed over that shown on the plans, and more complete details for these distributors should be submitted.

Sludge Bed. The sludge bed is 35 feet in length and 25.1 feet in width, giving a total area of 750 square feet. If this area should receive the contents of one of the sedimentation tanks, it would be covered to a depth of about 5 feet. This is very excessive and the bed should be redesigned so that it may receive the contents of the largest sedimentation basin without exceeding a depth of one foot. It is noted in the plans that the sludge bed is to be filled with gravel to a depth of 2 feet, the same to be underdrained in a manner similar to the sand filters. It is believed that better results may be obtained if the sludge bed is constructed in all essential respects like the sand filters; that is, it should have a depth of about 3 feet of sand underlaid by gravel covering the underdrains. The area of the sludge bed may be kept small, first by reducing the capacity of the tanks, and further, by dividing the tanks into a larger number of units. This will not only economize on the sludge bed, but will also provide greater elasticity in the operation of the tank.

Cost. The cost of the sewage purification works is estimated to be about \$7,500. This would make the total cost of the improvement, including the sewerage system, \$23,600. Of this, as already noted,

\$10,560 is to be obtained by special assessment on benefited property, which will leave \$13,040 to be raised by a bond issue. This latter sum represents 4.66 percent of the present total assessed valuation, namely, \$280,000. As the village is practically free from bonded debt at the present time, the above sum can be easily raised without exceeding the limits imposed by the Longworth Act.

These general plans for sewerage and sewage purification works for the village of Andover, submitted by Mr. L. E. Chapin, April 7th, 1910, were approved by the State Board of Health on May 10th, 1910, subject to the following conditions:

1st. That before any contracts are let there be submitted to the State Board of Health complete plans embodying certain changes of detail in the design of the purification works satisfactory to the engineer of said Board;

2nd. That a small shelter house be built at the site of the purification works for the convenience of the caretaker;

3rd. That the village maintain accurate and complete records describing and giving the location of all house connections, and that all house connections be inspected during construction by a representative of the village; and,

4th. That this approval be considered void unless contracts shall have been awarded on or before January 1st, 1912.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR BELLEFONTAINE.

On April 2nd, 1910, there were received from the Riggs and Sherman Company of Toledo, consulting engineers, plans for sewerage and sewage purification works for the city of Bellefontaine. These plans were referred to the engineering department for review and the following report was submitted:

Bellefontaine is located in the central part of Logan County, of which it is the county seat. The population as estimated from United States census reports is at the present time about 9,000. The area within the corporation limits is approximately 3 square miles. The topography of the village site and the surrounding country is somewhat rolling and drains into several small streams passing through the city, which ultimately find their way into the Miami River. Principal among these small streams is Possum Run, which passes through the central portion of the city and for a number of years has served as the natural drainage channel for storm flow sewage and other objectionable wastes. The geological formation in the vicinity of Bellefontaine consists of a thick covering of drift deposits (with an average depth of 80 feet) over-

lying limestone. These drift deposits consist of clay near the surface and rather extensive gravel deposits at greater depths, which latter are generally waterbearing and furnish the source of supply for most private wells.

Bellefontaine is a farming and manufacturing center. The principal manufactures consisting of metal working establishments and foundries. It may be noted that the Big Four Railroad shops, employing about 250 men, are also located at Bellefontaine. The city as a whole presents a neat and clean appearance and with the exception of the sewerage system is fairly well supplied with modern conveniences. Principal among these is a very satisfactory public water supply, which was installed in 1882 and which is obtained from deep wells in the southern part of the city. It is estimated that the water supply is used by about 6,000 persons, and its presence has encouraged the extensive introduction of modern plumbing so that there has been produced for the last number of years a large amount of sewage, which as already indicated, is discharged into the neighboring stream, principally Possum Run.

The total length of streets in the city is about 30 miles, of which three miles have been paved. Projects for more extensive paving are not being urged on the part of the local authorities in the absence of a system of sewers, as it is believed that sewers should logically be laid before street paving is installed. The need of paving has been so great in certain sections, however, that it has been laid together with lines of sanitary sewers plugged at both ends so as not to be available for use. These sewers are so laid that they may be ultimately connected with the comprehensive system of sewers for the whole city that is now proposed.

HISTORY OF SEWAGE PROJECT INCLUDING FORMER ACTIONS OF THE STATE BOARD OF HEALTH.

The history of the sewerage problem at Bellefontaine does not differ materially from the sewerage problem in many other Ohio towns. With the introduction of the public water supply, the need of sewers soon became evident, but the usual opposition to public improvements prevented their early installation, and in their absence sewage has been conveyed by private drains, storm water drains, and open channels to the nearest watercourse. It was but natural that Possum Run, which passes through the built up portion of the city, should receive most of these wastes. In a few years this run became a veritable open sewer and resulted in the creation of a gross nuisance during periods of warm and dry weather. In 1894 conditions had grown so bad that an appeal was made by the local authorities to the State Board of Health to visit Bellefontaine and condemn the use of the run for sewage disposal purposes. An inspection was accordingly made by the president and secretary of the Board and it was at that time advised that the only solution of the problem was the

installation of a comprehensive system of sanitary sewers. This advice, however, was not followed, and in May, 1900, application was again made to the State Board of Health for an investigation. As a result of this second investigation, the following resolution was passed by the State Board of Health and transmitted to the local authorities.

"WHEREAS, The city of Bellefontaine has applied to the State Board of Health for its opinion as to whether sanitary sewerage and works for the purification of the sewage and garbage were necessary for said city, and

WHEREAS, The State Board of Health has caused an investigation to be made, such investigation showing that such improvements are urgently demanded in the interest of public health, therefore, be it

Resolved, By the State Board of Health, that it is hereby declared necessary, and that it is earnestly recommended that a sewerage system and proper works for purifying the sewage and garbage of Bellefontaine should be installed at the earliest possible time."

In June the nuisance became so aggravated that the local board of health appealed to the State Board of Health to exercise its authority under a law permitting the Board to "make and enforce orders in local matters when an emergency exists." Before proceeding in the matter, however, the Board requested an opinion from the Attorney General with regard to the applicability of this law to the case in hand. It was ruled by the Attorney General that a nuisance, unlike an epidemic of disease, was a matter of more or less gradual growth and therefore could not be considered as an emergency, and that the law could not be interpreted as applying under the circumstances.

Ever since 1900 there has been more or less agitation in favor of the construction of a system of sewers, but the project has always been combated by those who will not favor any innovation which increases the tax rate, and also by those who already had the advantage of sewerage facilities through the use of drains leading to Possum Run and other small streams passing through the city. The combined opposition had been successful on four occasions in defeating elections on bond issues. It is now proposed to raise the necessary funds for trunk sewers and sewage purification works by the sale of bonds which may be issued under the Longworth Act, by council, without submitting the matter to a vote of the people. The lateral sewers, under this new scheme, will be built with money obtained by assessment on benefited property owners. It is believed that in this way sufficient money can be raised in the course of two years to build all of the principal trunk sewers and a purification plant capable of meeting the needs of the city for fully ten years to come.

In February of the present year the city engaged the services of The Riggs and Sherman Company of Toledo, consulting engineers. At the request of Mr. H. E. Riggs of this firm, the acting chief engineer visited Bellefontaine on February 17th, 1910, in order to become familiar with

the local conditions and to discuss informally the general features of the plans. The plans now before the Board provide for a complete system of sanitary sewers, sewage purification works, and storm water drains where necessary. All of the sanitary sewage is to be conveyed to a point in the southwestern part of the city in the valley of Possum Run and at a site suitable for the location of purification works. As it is possible to raise but \$20,000 for trunk sewers and purification works during the present year, the consulting engineers believe it advisable to devote this money to the construction of the greater portion of the trunk sewers and sedimentation tanks required in the purification works. During the succeeding year it will be possible for council to raise, under the provisions of the Longworth Act, an additional \$30,000 which it is proposed to devote to the completion of the purification works and possibly the construction of some additional trunk sewers. While the above construction is going on, it is expected that a sufficient sum of money can be raised by direct assessment on property owners to permit the construction of seven or eight miles of laterals covering entirely the main business section of the city and also the better residence sections. It is furthermore expected that the completion of the purification works will follow so closely upon the construction of the sewers that it will not be necessary to make any house connections until the purification works are ready for service.

Sewers. The system of sewers is to be constructed according to standard methods. Vitrified sewer pipe will be used throughout and this will vary in size from 24 inches for the largest trunk sewers to 6 inches from the smallest laterals. No lateral greater than 300 feet in length will be made as small as 6 inches in diameter. At each change of grade and direction will be placed standard manholes. At all dead ends will be placed flush tanks. The greatest distance between manholes will be about 500 feet. Wherever ground water is encountered in considerable quantity, it is expected to exclude the same by special construction. In moderately wet ground, cement joints will be held in place by means of cloth bandages. In more difficult ground the pipe will be supported on wooden cradles, in turn resting on piles. In such cases the entire pipe will be surrounded with concrete and underdrains will be placed where found necessary. It may be said in a general way that unusual precaution will be taken throughout to prevent storm water from entering the sewers in order to keep the quantity of sewage that reaches the purification works at a minimum.

There are not anticipated any unusual difficulties of construction other than three or four crossings under railroad tracks and streams, which will be made either of cast iron pipe or vitrified sewer pipe encased in concrete. With the exception of about 2,000 feet of 8-inch sewer pipe laid to a grade of 0.4 foot to 100, all of the sewers will be laid with sufficient grades to produce velocities from 3 to 5 feet per

second. With the sizes above indicated and the grades obtainable, it is believed that the sewerage system when finally completed will be capable of caring for a population of from 75,000 to 85,000 persons, which means that the system will serve the needs of the city for an indefinite period in the future.

Sewage Purification Works. The site selected for the purification works is, as already noted, in the southwestern corner of the city and about one mile from the business center. The distance to the edge of the built up portion of the city is possibly 1,800 or 2,000 feet, and intervening is a high embankment of the Big Four Railroad which effectively screens the works from view and will no doubt prevent to some extent the dissemination of odors in the surrounding locality. Within about 300 feet of the proposed location of the sedimentation tanks is a small four-room dwelling, considered as worth not over \$400. This dwelling is located on one-half acre of land and should the occupants thereof suffer the inconvenience of odors from the plant, this property could undoubtedly be purchased by the city for a comparatively small sum. The next nearest building is a farm house about 1,600 feet eastward of the sedimentation tanks.

An ample head is available for the construction of almost any type of plant, as by the deepening and straightening of the channel of Possum Run at this point, a difference of level of 16 feet with the outfall sewer and the bottom of the run may be obtained. The soil at the site of the purification works is a black sandy loam, extending to a depth of from 4 to 6 feet, under which is hardpan. There are also apparently pockets of gravel scattered through the soil, which tend to make it fairly porous and dry. It is believed that this soil may be available for broad irrigation as a finishing process to other devices. There are sand beds within one-half mile of the site of the purification works, but thus far it does not appear that the sand is of altogether satisfactory quality for use in sand filters.

The consulting engineers have not yet had time to thoroughly study the matter of sewage purification, and have therefore not been able to prepare definite plans showing the type and dimensions. However, they expect to be able to submit complete detailed plans fully sixty days before the contracts are let for the construction of the sewers. It is desired, however, at the present time to have the sewers approved by the Board in order that the necessary preliminaries in the way of advertising, etc., may be carried forward so that the construction of the sewers may be begun during the present year. It is the intention of council immediately after the first of the coming year to raise the necessary funds for proceeding with the construction of the purification works, and (with plans already approved) contracts can be let by the first of March, 1911. It is not believed that the sewerage system can be completed ready for

use before the summer of 1911, and it is therefore practicable to have the purification works finished at the same time.

At a meeting of the State Board of Health, held April 20th, 1910, this report was presented, and believing that further investigation was necessary before formal action could be taken, it was voted to refer the matter to a committee for further investigation and report. The president appointed Dr. Frank Warner, member, and Mr. Paul Hansen, acting chief engineer, to serve on this committee. May 7th, 1910, Dr. Warner visited Bellefontaine and secured the information on which the following report was based:

Your committee desires to report that as a general policy it is inadvisable for the State Board of Health to approve plans for sewerage and sewage purification unless the matter is handled as a single project involving the awarding of contracts for the sewage purification works at the same time as the awarding of contracts for the sewerage system proper. The case of Bellefontaine, however, involves rather peculiar conditions which make it impracticable to follow out this general principle.

As will be observed from reading the report of the engineer, sewerage for Bellefontaine has long been a necessity and was urged by the State Board of Health as early as 1894. It so happens that a number of persons in the city have had the conveniences of sewerage service through private drains and open ditches into Possum Run, a small stream which passes through the central, built-up portion of the city. This run has become grossly contaminated, much to the annoyance and discomfort of the people as a whole. On four occasions an attempt has been made to secure funds for the construction of an adequate system of sewers available to the entire population, but the attempt has always been defeated by those who already have the advantage of private sewerage and by certain others constitutionally opposed to any municipal expenditures.

The present local officials of Bellefontaine are progressive and are desirous of providing sewerage as a protection to the public health of the community, but in the face of the existing conditions they are forced to raise the necessary funds for the city's portion of the work by issuing bonds in amounts which will not exceed the limit at present imposed by the Longworth Act. Funds which can be so obtained are not sufficient to complete the work during the present year, and it is therefore necessary that a portion be done during 1911. Under these circumstances, the logical method of procedure from an engineering point of view is to begin the construction of certain trunk and lateral sewers to be paid for with appropriations available during 1910, and in 1911 to construct the purification works with appropriations available in that year.

In view of the foregoing and in the belief that the local officials were in good faith desirous of having the purification works completed

before the sewers were placed in service, the committee confirmed the statements of fact and endorsed the report submitted at the April meeting.

May 17th, 1910, the State Board of Health approved the plans for a system of sanitary sewers, as shown on drawings and described in specifications prepared by The Riggs and Sherman Company of Toledo, and submitted April 2nd, 1910, subject to the following conditions:

1st. That no contracts for the construction of sewers be entered into until plans for sewage purification works have been submitted to and received the approval of the State Board of Health;

2nd. That no contracts for the construction of sewers be entered into until land suitable for the location of purification works approved by the State Board of Health, is purchased;

3rd. That the purification works shall be completed or before January 1st, 1912;

4th. That no house connections whatever shall be made to any of the sanitary sewers until purification works are ready to be placed in service;

5th. That there shall be maintained complete and accurate records of the location of all house connections, and that provision shall be made for the thorough inspection by the city of the installation of all house connections; and,

6th. That unless construction is under way on or before January 1st, 1911, the terms of this approval shall be considered void.

After several conferences and more or less informal correspondence with the consulting engineers, there were submitted, on June 29th, 1910, general plans for sewage purification works, and these were reported upon by the acting chief engineer as follows:

The various general information concerning the city of Bellefontaine having a bearing on the sewerage problem is given in the report made to the Board in April.

Quantity and Character of Sewage to be Treated. The present population of Bellefontaine is variously estimated at between 9,000 and 11,000 persons; it is quite likely that the former figure is more nearly correct. Owing to the fact that the installation of a sewerage system is not a popular measure, it was necessary to raise funds for its construction by a vote of council without submitting the matter to a vote of the people. The money that can be raised by council in this manner is so limited that only trunk sewers and purification works can be built, while the extension of lateral sewers must be accomplished from time to time as the people demand their installation. For this reason it is not likely that a large population will be tributary to the sewers for a number of years to come. A fair estimate would place the number of persons tributary to the sewers at the end of 1920 at about 6,000, and it is believed that this is a reasonable period in the future for which to provide. The

present water consumption is rather large and the per capita flow of sewage may easily reach 100 gallons per day. The nominal capacity of the sewage purification works has therefore been placed at about 600,000 gallons per twenty-four hours. The character of the sewage will be almost purely domestic as there exist no manufacturing industries which produce wastes in any appreciable quantities.

General Features of Purification Works. The sewage purification works, as shown on the plans submitted, are to be located on the proposed site, previously described, in the southwestern corner of the city. The plant comprises a screen chamber; two sedimentation or reduction tanks, as they are called by the consulting engineers; four contact beds; and four broad irrigation fields. These will be described in the order mentioned as follows:

Screen Chamber. The screen chamber is a small concrete structure open at the top and placed at the inlet of the sedimentation tanks. It contains two screens, both made of rectangular iron bars 1-2 inch by 1 1-4 inches in cross-section. These bars are made into a frame by means of through bolts. A better arrangement would be to have the bars held at the ends in a suitable frame, thereby facilitating the process of cleaning with a rake.

Sedimentation Tanks. There are two sedimentation tanks, each 105 feet long and about 7 feet, 9 inches in depth. The width of the larger tanks is 25 feet and that of the smaller 15 feet. The total sedimentation capacity is thus 244,000 gallons, representing a period of flow based on the nominal capacity of the plant of 9.76 hours. The small tank has a flow period of 3.66 hours and the large tank a period of 6.10 hours. Sewage is admitted to each tank by means of an inlet channel and is controlled by a sluice gate within the screen chamber. From the inlet channels the sewage passes into each tank through seven 6-inch openings equidistantly spaced across the width of the tank. At the outlet end of each tank the sewage is drawn off through a similar set of openings. At one-half the distance from the inlet to the outlet end of each tank is placed a hanging baffle, and at two-thirds of the distance from the inlet end to the outlet end of each tank are placed a hanging and a submerged baffle. The function of this latter is to intercept all floating and suspended matter that may be thrown up by fermentation of the sludge in the upper end of the tank. The bottoms of the tanks are well sloped so that sludge may be discharged on to a suitable sludge disposal area.

It is proposed to leave the tanks open owing to the remoteness of the locality from habitations. It is not anticipated that this will give rise to offensive odors. The likelihood of the dissemination of odors is further minimized by surrounding the tanks with walls rising about 6 feet above the water level. It is expected that trees and shrubs will

be planted about the tanks in order to reduce the effect of wind in carrying odors.

From the sedimentation tanks the sewage will flow in an open channel to a control chamber at the center of four contact beds.

Contact Beds. The contact bed area is in the form of a rectangle having interior dimensions of 200 feet by 240 feet. Four beds are formed by diagonal walls within this rectangle. The beds consist of shallow concrete basins with 4-inch flooring and 9-inch enclosing and dividing walls. The walls have a height of 6 feet above the bottom. The total area of the contact beds is about one acre, and the thickness of the contact material is 5 feet. There will thus be a population tributary of 1,200 persons per acre-foot when the plant is operating at nominal capacity. With this load a very satisfactory effluent should be produced, and if the flow per capita is not excessive each bed should have a little over one contact per day. The contact material will consist of a hard broken limestone. The upper 4 1-2 feet will consist of particles varying in size from 1-2 inch to one inch, while the lower 6 inches will consist of particles varying in size from 2 to 3 inches. This arrangement is made to facilitate underdrainage. The underdrainage will be further facilitated by a system of underdrain tile. The lateral drains will be 6 inches in diameter and will be placed 20 feet center to center. The main drains will be 8 inches in diameter and will extend along the long side of each filter. Sewage will be discharged on to the surface of the bed by means of 36-inch split tile sewer pipe, laid with open joints and filled with crushed stone somewhat finer than that used within the bed proper. It is expected that this arrangement will limit the clogging of the stone within the tile, which may be readily removed and replaced.

The automatic apparatus for operating the contact beds has not as yet been decided on, but the engineers will submit complete plans before such apparatus is installed.

Broad Irrigation. Owing to the small size and intermittent character of Possum Run, into which the sewage effluent must be discharged, it is not believed that the contact beds can effect a sufficiently high degree of purification. Some finishing process is therefore necessary. Owing to limited funds it is desired to accomplish this final treatment at minimum expense and to this end broad irrigation has been suggested by the consulting engineers. On the land belonging to the city there are about five acres of low lying ground which may at small expense be underdrained and divided up into suitable areas. There is some doubt, however, as to whether the soil is sufficiently porous to prevent it from becoming water-logged. It is therefore deemed advisable not to adopt the broad irrigation method until soil tests have been made both by flooding experimental areas and digging test pits, which demonstrate quite clearly whether this method is a feasible one. Should broad irrigation not prove feasible, there should be installed two acres of intermittent

sand filters divided into four beds, one for each contact bed. These filters should be substantially constructed of good clean sand of not less than 3 feet in depth.

Sludge Disposal. No sludge disposal area is shown on the plans. This may be provided by underdraining about one-half acre of the most porous of the natural soil on the city's property and surrounding same with suitable embankments.

At a meeting of the State Board of Health, held June 30th, 1910, these plans for sewage purification for Bellefontaine, submitted by The Riggs and Sherman Company on June 29th, were approved subject to the following conditions:

1st. That 2 acres of intermittent sand filters be substituted for the final treatment by broad irrigation unless it is amply demonstrated to the satisfaction of the engineer of the State Board of Health that the soil is of satisfactory character for this purpose;

2nd. That plans for all automatic controlling machinery be submitted to and receive the approval of the engineer of the State Board of Health before being installed;

3rd. That samples of all contact and filtering material be submitted to and receive the approval of the engineer of the State Board of Health before being placed;

4th. That complete plans and specifications be filed with the State Board of Health as soon as same are prepared;

5th. That as soon as the works are completed there be appointed by the city a competent person to act as superintendent of sewerage and sewage purification; and,

6th. That the sewage purification plant be completed and ready for operation before any house connections whatsoever are made with the sewerage system.

REPORT ON PROPOSED ENLARGEMENT AND IMPROVEMENT OF THE SEWAGE PURIFICATION PLANT AT CANTON.

On November 30th, 1910, there were received from Mr. Ray F. Harbert, director of public service of Canton, a preliminary report and general plans and estimates for the enlargement and improvement of the sewage purification plant of that city, prepared by Mr. L. E. Chapin, consulting engineer. These were referred to the engineering department and the following report was submitted:

The existing sewage purification plant of Canton is designed on the chemical precipitation principle. It was the first plant installed in the state of Ohio with the possible exception of a small broad irrigation sys-

tein at Oberlin. The plant has been very fully described in the annual report of the State Board of Health for 1903 and in the special report on water and sewage purification in Ohio, 1908. As may be seen from reading the above references, the plant has been badly outgrown for several years, and the necessity for its enlargement has been well understood by the city officials; but owing, probably, to the lack of desire to spend money for such purpose, nothing has been done in regard to making the needed improvements. By referring to the table appended to this report and taken from the report of the consulting engineer, it will be seen that the number of connections to the sewers has increased from 990 in the year 1903, to 6,282 in the year 1909. From this it may be considered that the plant is five or six times smaller than it should be. Furthermore, it should be remembered that the method of purifying the sewage by chemical precipitation is not in accordance with the most modern approved practice.

After discussing three possible methods of enlarging the plant and providing for the installation of filters, the consulting engineer recommends that the present chemical precipitation tanks be remodeled, enlarged, and used for septic tanks, and that effluent from such tanks be treated in sprinkling filters and finally by sedimentation. It is proposed to locate the sprinkling filters on land now owned by the city and adjacent to the existing plant. In order to obtain sufficient head for operation under the proposed conditions, it will be necessary to lift the sewage about 10 feet, and to accomplish this it is proposed to transform the present chemical building into a pumping station and locate therein centrifugal pumps. It is also proposed to use some form of screen in order to relieve the work of the septic tanks; and to dispose of the screenings under the boilers or in the city garbage crematory which is located a few hundred feet distant.

The proposed improvements when completed would provide for the present needs of the city, although if the present rate of growth is continued, the plant would have to again be enlarged within the next ten years at least.

As stated above, the report and plans are of very general nature and should be so considered when acted upon by the Board at this time. It is understood that when the city raises the necessary funds, full and complete detailed plans will be submitted for approval.

The proposed project of purifying the sewage by screening, sedimentation in septic tanks, treatment on sprinkling filters, and final sedimentation, will, if the proposed conservative rates are not exceeded, produce a final effluent which when discharged into Nimishillen Creek will not create a nuisance.

The feature of locating the new and enlarged plant upon the present site should be very carefully considered before being adopted by the city officials or approved by the State Board of Health. The present

site, chosen twenty years ago, is just outside the southerly corporation limits and is within one-half mile of certain districts of the city that are fairly well built up. During the past there have been complaints from the occupants of isolated houses located not far from the present sewage plant, and if the territory now intervening between the plant and the built up portion of the city should become more thickly settled, the proposed sprinkling filter plant would probably be a source of complaint due to odors arising therefrom.

Up to the present day, sewage disposal plants have been designed with the principal object of obtaining a purified effluent that is suitable to discharge into the stream which is to receive it. Sanitarians have approved or condemned a plant principally according to whether the degree of purification was satisfactory or not. The odors which may have been created incidentally to the processes of purification have probably not been injurious to health and have been given little attention by scientific investigators. Nevertheless, the standard by which the layman and the public judge the plant is largely that of odor in the vicinity of same, and for this reason it is believed that more care should be given to the location of new sewage purification plants.

Referring to the system now proposed for Canton, that of sprinkling filters, it is generally acknowledged that this system affords the greatest opportunity for the dissemination of odors as the foul liquid is sprinkled through the air, giving an excellent opportunity for the wind to convey the odors for considerable distances. It is well-known that the plant of the city of Columbus, the largest sprinkling filter plant now in operation in this country, causes at times distinctly disagreeable odors; and that if the plant had not been placed as far as it is from habitations, there would have been much complaint. The city of New York within the last year, in connection with studying sewage purification, sent one of its engineers to the Columbus plant with instructions to remain two days and investigate as far as possible the distance over which the odors from the septic tanks and sprinkling filters could be detected. The engineer reported that during his visit he detected strong and nauseating odors at a distance of three-fourths mile from the plant, and that he gathered from the testimony of several persons interviewed that offensive odors not infrequently were carried a distance of one and one-half miles from the plant.

The plan of the consulting engineer if followed will provide for an area of sprinkling filters 0.6 as large as that at Columbus, and unless unprecedented precaution should be taken to prevent odors, it can be prophesied with reasonable assurance that there will be complaint due to odors from the plant on the part of the present residents of the southwesterly corner of the corporation as well as from such future residents as may occupy land nearer the plant.

December 14th, 1910, the State Board of Health approved the gen-

eral method proposed for purifying the sewage of Canton by means of screening, sedimentation, and sprinkling filters, as set forth in a preliminary report and general plans and estimates prepared by Mr. L. E. Chapin, consulting engineer, and submitted by Mr. Ray F. Harbert, director of public service of Canton, on November 30th, 1910.

The authorities were advised that, in view of recent experience with sprinkling filter plants, the Board was of the opinion that a new site of greater area than the present one and farther removed from the city should be obtained in order to avoid future complaints by residents of the southerly portion of the corporation, and approval of the present site for the new plant was therefore withheld.

CANTON, OHIO, SEWAGE DISPOSAL PLANT.

Schedule Showing Sanitary Sewers; Connections; Average Daily Flow; Gallons per Service; Daily Water Pumped and per cent. of Sewage Flow to Water Pumped, For the Years 1903 to 1909, inclusive.

Date.	Miles of sewers.	Number of connections.	Sewer connections per mile of sewers.	Daily flow of sewage.	Gallons of sewage per sewer connection.	Avg. daily gallons of water pumped at water works station.	Avg. amount of water to reach disposal plant.
1893 end of year.....	17.88	990	55.36	**800,000	808	1,766,124	45 per cent.
1894 end of year.....	18.22	1,064	58.40	.....	.....	1,968,857	53.4 per cent.
1895 end of year.....	18.22	1,119	61.41	1,280,280	1,144	2,395,371	48 per cent.
1896 end of year.....	18.22	1,201	65.92	1,123,944	1,185	2,959,865	43 per cent.
1897 end of year.....	18.22	1,297	71.18	.....	.....	2,989,144	54 per cent.
1898 end of year.....	18.22	1,376	75.52	1,600,000	1,163	3,687,781	50 per cent.
1899 end of year.....	18.22	1,459	80.00	1,700,000	1,170	3,165,339	60 per cent.
1900 end of year.....	18.98	1,615	85.00	.....	.....	3,554,970	.....
1901 end of year.....	19.74	1,765	89.11	.....	.....	3,300,747	.....
1902 end of year.....	20.50	1,971	96.15	1,900,000	964	3,664,466	.....
1903 end of year.....	21.29	2,141	100.56	2,250,000	1,050	3,722,212	.....
1904 end of year.....	22.74	2,471	73.24	.....	.....	4,361,453	.....
1905 end of year.....	46.14	3,308	71.70	.....	.....	.....	.....
1906 end of year.....	58.55	3,956	67.56	.....	.....	5,273,056	.....
1907 end of year.....	4,785	4,785	74.77	*2,120,000	447	5,508,018	40 per cent.
1908 end of year.....	71.41	5,534	77.50	.....	.....	5,558,353	.....
1909 end of year.....	77.20	6,282	81.37	2,401,040	382	6,148,850	39 per cent.

** Estimated.

* State Board of Health

REPORT ON PROPOSED SEWERAGE FOR A PORTION OF SEWER DISTRICT NO. 1, CONNEAUT.

On June 20th, 1910, a plan for sewerage for a portion of Sewer District No. 1, Conneaut, was submitted to the State Board of Health by Mr. T. F. Lininger, city engineer. Inspection of the district to be sewered and of the location for the proposed outlet was made by a representative of the engineering department on July 19th, 1910.

The proposed sewers, which will receive domestic sewage only, are intended to serve that portion of Sewer District No. 1 in the vicinity of Main Street. The outlet, 8 inches in diameter, will enter the Conneaut River at the foot of Center Road. The area tributary to the proposed sewer is about 45 acres in extent, most of which is as yet undeveloped. The topography of the area is such that it is impossible to connect by gravity with any of the existing outlets. It is estimated that the population of the district will not for many years, if ever, exceed 450.

The additional pollution of the Conneaut River due to the proposed sewers will probably not be noticeable, if the mouth of the sewer is carried below the level of the river and the sewage not allowed to run over the river bank. The point of discharge is three and one-half miles following the river from Lake Erie, and would, therefore, have much less effect on the quality of the water near the water works intake than do several larger existing sewers which discharge nearer the lake.

At a meeting of the State Board of Health, held July 27th, 1910, this plan, submitted by the city engineer, Mr. T. F. Lininger, June 20th, was approved provided:

1st. That the outlet at the foot of Center Road be extended by means of iron pipe into the center of the river and discharged below low water level; and,

2nd. That this approval be valid until January 1st, 1912.

The attention of the director of public service was called to the fact that the sewage from Conneaut will before many years have to be purified, and steps should be taken at the present time towards making plans for constructing an intercepting sewer and purification works, and also toward purchasing a site for proposed works.

REPORT ON PROPOSED SEWERAGE FOR EAST YOUNGSTOWN.

On August 24th, 1910, there was submitted by Mr. George M. Montgomery, consulting engineer for East Youngstown, a plan showing proposed sewerage system for that village. On September 30th, 1910, the chief engineer visited East Youngstown and in company with Mr.

Montgomery inspected the village. At this time it was suggested to the consulting engineer that certain changes be made in the plan. These suggestions were adopted and the amended plan was submitted November 9th, 1910, which was reported on by the engineering department as follows:

The village of East Youngstown, having a population of about 5,000, is adjacent to the city of Youngstown and covers an area of approximately 600 acres bordering the Mahoning River down stream from the city of Youngstown. The village is inhabited principally by foreigners, who are employed in the steel plants of the Mahoning Valley, and the sanitary conditions of most of the houses and yards are very bad, especially as there is at present no sewerage system. The steep hill upon which most of the village is located affords natural drainage, however, which makes conditions slightly better than would be the case with a village having the same character of population and a flat topography.

The proposed sewerage system is designed to accommodate a population of 10,000, which is the population anticipated fifteen years hence. Figuring 100 gallons per capita, it is expected that at least 200,000 gallons of sanitary sewage will be produced as soon as the system is installed, while one million gallons will be produced ultimately.

The system when completed is to be strictly on the separate plan, although for present installation there will be some departure from this, as explained below.

The total length of sewers in the completed system will be 11.6 miles of sanitary sewers and 3.6 miles of storm water sewers. This will provide for every house that can be built within the present corporation limits. For present installation, however, there are to be installed 1,200 feet of 12-inch vitrified sanitary sewers, 1,200 feet of 24-inch storm sewers, and 3,400 feet of reinforced concrete conduit.

The purpose of the consulting engineer is to at present provide for both storm water and sanitary drainage in the district covered. The sewage will therefore be kept separate until it reaches the large reinforced concrete conduit located in Broad Street. Into this conduit both storm water and sanitary sewage will be discharged, but cast iron fittings will be installed at each connection with the sanitary sewers in order that future cast iron pipe 18 inches in diameter may be placed inside of the concrete conduit for the purpose of keeping the sanitary sewage separate and conveying it to a purification plant.

In brief, the consulting engineer desires for the present to construct a partially separate and partially combined system with an outlet for the unpurified combined sewage into the Mahoning River at the easterly or downstream village limit, which boundary also forms the upper limit of the village of Struthers; but the engineer at the same time, looking toward the future, has designed the sewers so that a complete separation may be effected in the future without unnecessary expense.

All roof water is to enter the storm sewers, while the cellar drainage will enter the sanitary sewers. Manholes are to be placed 300 feet apart and will be depended on for ventilating the sewers. The method of making house connections with the sanitary sewers is not described by the consulting engineer, but this is a matter that will come under the plumbing or building inspector later.

As is well-known the Mahoning River below Youngstown has been for many years grossly polluted by the sewage of that city. The discharge of a comparatively small additional amount from East Youngstown would probably cause no apparent change in the already polluted river water. The village of Struthers, immediately below East Youngstown, was in 1908 granted permission to install a sewerage system with outlet into the river "with the understanding that the village shall be called upon to install a sewage purification plant of a design satisfactory to the State Board of Health whenever this is deemed necessary by said Board."

An important feature which should be considered in connection with the pollution by sewage of the Mahoning River in this district is the fact that the iron or acid iron wastes discharged by the several sheet mills doubtless have a purifying effect upon the organic matter of the sewage; and although this should not be considered as a dependable method of purifying the sewage, nevertheless it doubtless has a beneficial influence on the quality of the water throughout a distance of several miles below Youngstown.

When the city of Youngstown is compelled to purify its sewage, it will doubtless have to choose a site below the villages of East Youngstown, Struthers, and possibly below Lowellville, as the valley below the city and adjacent to East Youngstown and Struthers is solidly built up with iron working industries and is occupied by railroads. Neither is there a desirable site available for purification works for East Youngstown within its own limits. The purification of the sewage from this village, therefore, must be taken up in connection with the purification of the sewage from the other places above mentioned. In view of this, it would seem better to permit East Youngstown to proceed with its proposed sewerage improvements and thus improve the present filthy sanitary conditions of the village rather than to delay the improvement by insisting upon the construction of an independent sewage purification plant at great expense to this village.

November 30th, 1910, the State Board of Health approved the plan for a sewerage system for East Youngstown as shown on the drawing submitted by Mr. George M. Montgomery, consulting engineer, on November 9th, 1910, and described in the information blank to accompany said drawing, received November 22nd, 1910, provided:

- 1st. That plans for a sewage purification plant be prepared and submitted to the State Board of Health for approval whenever the city

of Youngstown, or the village of Struthers, submit such plans; and further, that construction of a sewage purification plant of a design satisfactory to the State Board of Health, either independently or jointly with Youngstown or Struthers, be begun whenever the above mentioned municipalities begin construction of such plants; and,

2nd. That this approval be void after January 1st, 1913, unless construction of the sewers is begun before that date.

REPORT ON PROPOSED SEWER AT FREEPORT.

It having come to the attention of the State Board of Health that there was being constructed in Freeport a system of sewers, the matter was investigated by the engineering department February 15th, 1910, and the following report made:

The village of Freeport lies in the southwestern portion of Harrison County on Big Stillwater Creek and has an estimated population of 800. The area included within the corporation limits is about 0.6 square mile. The territory within and surrounding the village is very hilly. The main portion of the village itself is located on the crest of a hill about 130 feet above the bed of Stillwater Creek. Freeport is primarily a farming center and has no industries other than a flouring mill and a saw-mill.

In the summer of 1909, Mr. B. W. Rowland, of Cadiz, obtained a franchise from the village to build an 8-inch sewer in Philadelphia Street together with several tributaries in adjoining streets. On February 15, 1910, one of the engineering assistants of the Board visited Freeport and found that out of the 2,700 feet total length of sewers for which a franchise had been granted, about 2,500 feet had been laid. The sewers are apparently crudely constructed, have a depth of about $2\frac{1}{2}$ feet, and conform generally to the natural slope of the surface of the ground. This slope in no instance is less than $1\frac{1}{2}$ feet per 100. The main sewer is said to have been built of vitrified sewer pipe with bell and spigot ends and cemented joints. None of the work was open so that it might be inspected. As an indication of the crudeness with which the sewers have been built, it may be noted that no provision has been made for man-holes or flush tanks. It is expected that flushing will be accomplished by the admission of roof water from houses at several points.

The sewer was built primarily to take care of sanitary wastes which have constituted a troublesome problem since the village has had the use of a public water supply, but as yet no house connections have been made. The point of outlet is into Big Stillwater Creek about 500 feet above the upper Baltimore & Ohio Railroad crossing. The discharge is into a backwater formed by an old channel of the creek, and the accumulation of sewage at this point during low stream flow will undoubt-

edly cause a nuisance in the immediate vicinity. Odors may even be carried a distance of 300 feet to houses on Philadelphia Street. The matter of a nuisance, however, is not the most serious objection to the discharge of the proposed sewer into Big Stillwater Creek, but rather the fact that this stream is used by the villages of Dennison and Uhrichsville as a source of public water supply at a point about eighteen miles below. It is true that the water that is being delivered to consumers is purified by a mechanical filtration plant, but the existing plant is of somewhat antiquated type and may at times give inefficient results. Undoubtedly within the distance between Freeport and Uhrichsville a great degree of self-purification takes place in the waters of the stream, but on the whole it is considered inadvisable to permit untreated domestic wastes to be turned into so small a watercourse, even though the water is subsequently purified before being used for domestic purposes.

May 14th, 1910, the State Board of Health disapproved the use of this sewer as a carrier of house sewage or any domestic or putrescible wastes whatsoever, and the authorities of Freeport were notified that no connections were to be made with said sewer unless adequate purification works were built for properly taking care of the sewage before it is discharged into Big Stillwater Creek.

They were also notified that before any contracts were let for the construction of purification works, plans thereof should be submitted to and receive the approval of the State Board of Health.

In view of the existence of a public water supply in the village, the authorities were advised that it would be highly desirable to arrange for the installation of an adequate system of sanitary sewers which might ultimately be extended to all parts of the village and so designed that all sewage might be conducted to a single point and there purified.

REPORT ON PROPOSED SEWAGE PURIFICATION FOR THE GREENE COUNTY INFIRMARY, XENIA.

On June 28th, 1910, a request was received from the directors of the Greene County Infirmary, through their consulting engineers, Messrs. Burgess, Kimberly and Long of Columbus, for approval of the general scheme for sewage purification at that institution. The request was referred to the engineering department and the following report was submitted:

Inasmuch as the report of the consulting engineers covers all of the essential features necessary for a proper consideration of the project for sewage purification for the Greene County Infirmary, this report is quoted in full as follows:

The infirmary of Greene county is situated about 1 1-2 miles west of the corporate limits of the city of Xenia. The maximum winter population is said to be about 75. The institution comprises a main building, a hospital building and several barns and sheds. For years the sewage from this institution has been discharged through a pipe sewer extending about 1,000 feet in a northerly direction and terminating at the head of a gulley which in wet weather is a feeder of the Little Miami River. In view of the fact that in recent years the sewage of the institution has given rise to complaints and threatened suits, on the part of the property owners below the sewer outlet, the infirmary directors now plan to make other disposition of the sewage.

PROPOSED PLANT.

The proposed plant will consist of a small screen chamber, a settling tank, a dosing tank, and two sand filters flooded in turn by alternating siphons. The filters will be located about 500 feet east of the institution and at an elevation of at least 25 feet below that around the main buildings. The location is such that no objectionable odors will probably ever be noted at the institution.

The plant will be designed for a population of 100 and a water consumption of 40 gallons per capita. Since the population is said never to have exceeded 75, the plant will be ample for the needs of the institution for many years.

Screen Chamber. The sewage from the institution will be conducted in an easterly direction and will first be screened at a small covered screen chamber situated just above the settling and dosing tanks.

Settling and Dosing Tanks. At the present time there exists east of the main building of the institution and distant about 250 feet therefrom an unused, covered, brick cistern about 11 feet in diameter and 11 feet deep. It is planned to divide this tank into two compartments, one to serve as a settling tank and the other as a dosing tank.

The settling tank will be baffled and will have a capacity of 1800 gallons and will be 6 feet deep. The dosing tank will have a capacity of about 2,000 gallons and will be discharged by two alternating siphons each drawing 5 feet.

Sand Filters. From the dosing tank, the sewage will be discharged alternately onto the two sand filters. The total effective area of the filters will be 1/15 acre (2904 sq. ft.). Each unit will have a surface area 43.35 ft. square or 1879 sq. ft. The filters will contain 3 ft. 6 in. of sand of approved quality. The sand will rest on a graded gravel layer 6 inches in thickness and provided with ample drainage facilities. Sewage will be distributed over each sand filter by a line of one-half tile extending on the diagonal to the center of each unit, at which point a concrete slab will be provided to prevent the disturbance of the sand

during flooding. A manhole will enable sewage from either siphon to be diverted to either filter as desired. The two units will be separated by a low concrete wall and will be surrounded by the usual earth embankments. There will be provided an effluent manhole where samples of the filtered sewage may readily be obtained.

The effluent from the plant will flow into a gulley which is practically dry save in wet weather and extends in a general north-westerly direction.

GENERAL REMARKS.

Based upon a population of 100, the sand filters are to be designed with a population load of 1500 per acre. This figure would probably be too high for a municipal plant, but for an infirmary, this loading does not seem too great. Reference to the special report of the Ohio State Board of Health, 1908, Table No. 107, will show that at Trumbull County Infirmary, Warren, the population load is 2200 per acre, or nearly twice what would be proper for a municipal plant and yet the results are excellent. Furthermore, on the assumed per capita water consumption of 40 gallons, a figure which may be reached on wash days, the net rate of filtration will be only 60,000 gallons per acre in 24 hours, and only 45,000 gallons per acre in 24 hours for the present maximum winter population of 75.

It is believed that the proposed plant will satisfactorily and efficiently overcome the present sewage nuisance at the institution. That the preliminaries incidental to construction may be started, it is respectfully requested that the Board take provisional action upon the general project as above outlined.

At a meeting held June 30th, 1910, the State Board of Health approved the general scheme for sewage purification for the Greene County Infirmary, near Xenia, as set forth in the report submitted by Messrs. Burgess, Kimberly and Long, consulting engineers, June 28th, 1910, upon the following conditions:

- 1st. That before contracts are let, a full set of detailed plans and specifications be submitted which shall meet the approval of the engineer of the State Board of Health;

- 2nd. That as soon as the purification plant is completed and placed in operation, the infirmary directors designate a responsible person as caretaker, who shall maintain and operate the plant in accordance with instructions from and in a manner satisfactory to the State Board of Health; and,

- 3rd. That this approval be considered void unless contracts are awarded on or before January 1st, 1911.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR HUBBARD.

On September 2nd, 1910, there were received from Mr. William Wilson of Youngstown, consulting engineer for the village of Hubbard, plans for a sewerage system and sewage purification plant for that village. These plans were referred to the engineering department and were reported on as follows:

The village of Hubbard, having a population of about 1,500, is located in the southeasterly corner of Trumbull County within two miles of the Pennsylvania state line. The village is about one mile square. The principal street, which passes in a northerly and southerly direction through the center of the village, is located in a valley so that the easterly and westerly portions of the village, respectively, slope toward the center.

There is no watercourse of considerable size in the immediate vicinity of the village. A small creek, so-called, having a drainage area of only about three and one-half square miles, passes approximately through the center of the town, flowing in a northerly direction, and a short distance outside the village limits enters Little Yankee Creek, a tributary of the Shenango River. The water of the creek, not far from the village, is used for industrial purposes at the Hubbard Furnace and the American Sintering Plant, and for this reason it is desired that the sewage which will be discharged from the proposed sewers be purified to a considerable degree.

PROPOSED SEWERAGE.

At the present time there are no sewers in the village. It is proposed to install, according to the plans submitted, about four miles of sanitary sewers of sizes ranging from 8 to 15 inches. The main sewer, 15 inches in diameter and located in Main Street, is to extend to a tract of land just north of the corporate limits and adjacent to the creek, at which point it is proposed to locate the sewage purification plant. This site is not so far removed from the village as might be desired; on the other hand, it seems to be the best available site that can be used without cause for complaint. The nearest houses are within four hundred feet, but these are of a cheap character and could be purchased by the village if necessary.

PROPOSED SEWAGE PURIFICATION PLANT.

The method of purification is to be screening, sedimentation, and intermittent filtration through sand. The nominal capacity of the plant will be 100,000 gallons per day, which, if the sewers are constructed properly, will be much more than will be produced by the village for some time to come.

Screen Chamber. The 15-inch sewer will discharge first into a

screen chamber containing two screens constructed of parallel iron rods. The first screen is to be composed of 1-2-inch rods spaced 1 1-2 inches center to center, and the second 1-2 inch rods spaced one inch center to center.

Sedimentation Tanks. The screened sewage next enters the sedimentation tanks, one of which is 10 feet by 45 feet by 6 feet and the other 20 feet by 45 feet by 6 feet. This design permits of more elasticity in securing the right period of sedimentation. The tanks are to be baffled and each will contain two separate sludge outlets at the bottom. The sedimentation tanks as well as the dosing tank, mentioned below, are to be covered by a flat wooden roof.

Dosing Tank. The dosing tank, which receives the settled sewage and discharges the same intermittently upon the sand filters, is to be 30 feet square in plan with an effective depth of 3 feet, thus giving a capacity of 16,000 gallons, which is sufficient to flood one filter to a depth of 3 inches. The dosing tank is to contain four automatic siphons to operate in rotation, each siphon discharging upon a separate sand filter.

Filters. The sand filters are four in number, each 100 feet square, thus giving a total area of about one acre. The surface of the sand will be below the level of the present ground so that the filters will be surrounded by earthen embankments. These embankments are to be sodded.

The filtering material is to consist first of from 3 to 6 inches of gravel, on top of which will be 30 inches of sand of a quality to be approved later. The sewage will enter each filter at one corner and be distributed over the surface by means of wooden troughs leaving outlets at seven points on each filter. There will be three lines of 4-inch underdrains, 33 feet apart, discharging into a main underdrain 10 inches in diameter.

Sludge Bed. In addition to the sand filters, there will be a sludge bed 40 feet by 125 feet in area and of the same type of construction as the main filters. This will be placed at such an elevation that it can receive the entire contents of the sedimentation tanks by gravity when the same are cleaned.

September 21st, 1910, the State Board of Health approved these plans submitted September 2nd, 1910, by the consulting engineer, Mr. William Wilson of Youngstown, for a sewerage system and sewage purification plant for the village of Hubbard provided:

1st. That samples of all filtering material be submitted to the chief engineer of the State Board of Health for approval before the same is placed; and,

2nd. That this approval be valid only until January 1st, 1912.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR HUDSON.

On October 26th, 1910, plans for proposed sewerage and sewage purification for Hudson were submitted by Mr. D. M. Hosford of Cleveland, consulting engineer. In anticipation of plans being submitted, the village was visited by the chief engineer on March 5th, 1908, and by the acting chief engineer on March 9th, 1910. The plans were referred to the engineering department and the following report was submitted:

The present population of Hudson is about 750, and the area is 0.6 square mile. There is no public water supply nor sewerage system at the present time, but plans for both of these improvements have been prepared at the expense of Mr. James W. Ellsworth, a former resident of Hudson, who in view of the fact that the village voted to exclude saloons for a certain number of years, has agreed to construct at his own expense a water supply, sewerage system, and paved streets.

The proposed sewerage system will be strictly on the separate plan. The domestic sewers have a total length of 15,000 feet ranging from 12 to 16 inches in diameter. In addition there will be about 1,000 feet of 6 and 8-inch cast iron pipe sewers in the form of inverted siphons.

The sewerage system is designed to comfortably take care of a dry weather flow of 150,000 gallons, or more than would probably be produced by double the present population. The sewers will be provided with automatic flush tanks, and no cellar or roof drainage will be admitted. The sewers will be ventilated through the house soil pipes, the same being extended above the roof.

The site selected for the location of sewage purification works lies in a northeasterly direction, about three-fourths of a mile from the center of the village, and is adjacent to the Pennsylvania Railroad tracks. The nearest building to the proposed site is about 600 feet distant, but aside from this there are no habitations within 1,000 feet. A highway passes within several hundred feet of the proposed site, but on the whole the site may be considered as well suited for the purpose for which it is proposed.

The purified effluent will be discharged into Brandywine Creek, which has a watershed of about nine square miles and which is tributary to the Cuyahoga River. No public water supply is obtained from this stream.

The sewage purification works are designed to treat 75,000 gallons per day, or the sewage from 750 persons. The sewage before it reaches the plant, will be screened in a screen chamber located near the corner of Brown and First streets, at which point will be installed a 1-2 inch screen consisting of parallel iron bars.

Upon arriving at the plant, the sewage will first enter a distribution chamber or valve house, from which it may be diverted into the sedimen-

tation tanks. These tanks are of reinforced concrete construction, 43 feet by 45 feet in plan, with a maximum depth of 10 feet. The total capacity of the tanks is 60,000 gallons, or a little less than eighteen hours' flow. They are divided longitudinally into three divisions which are 7 1-2, 10, and 12 1-2 feet wide, respectively. This will allow possibly six distinct storage periods with a given sewage flow. The tanks are baffled at inlet and outlet, and are covered with a concrete roof. An 8-inch cast iron sludge drain passes across the three tanks at their centers or lowest points.

The effluent from the sedimentation tanks will pass into a shallow concrete basin adjacent to and under the same roof as the sedimentation tanks. This basin serves as a dosing tank. It is 35 feet by 37 feet in plan and 3 feet deep below the maximum flow line, thus giving a maximum capacity of about 30,000 gallons. This size of dose has been chosen with the idea of filling the voids in the filtering material in one of the primary or contact filters after such filter has been in use for some years and amounts to about twenty percent of the cubical contents of one filter basin. The tank is to be discharged by four automatic siphons, each connected with a separate contact filter and operating in rotation.

The contact filters are four in number, each 58 feet square and 5 feet deep, and are constructed with concrete side walls and bottoms, the latter draining toward the outlet with a slope of 0.75 percent. From the above discussion of the dosing tank, it will be noted that the contact filters are to receive the sewage in sudden applications covering a period of not more than six or seven minutes, instead of receiving the sewage continuously as is the usual practice. It is somewhat doubtful whether the use of a dosing tank in this manner will be of special advantage, although with the proposed arrangement of applying the sewage to the stone, there can result no detrimental effect. This method of operation would nevertheless prevent the sewage standing in the contact filters for unduly long periods when the rate of flow is very small.

The sewage will be applied to the contact material by means of half round 12-inch vitrified pipe embedded in the material, the edges of the pipe being flush with the surface of the filter. A certain amount of suspended matter will thus be retained in the tile instead of being discharged on to the broken stone and tending to clog the same.

The contact filters will be discharged by automatic timed siphons so that the sewage can be held in any one of these filters during whatever period that may be desired. The discharge line from each contact filter is connected directly with one of the sand filters. This arrangement serves the double purpose of discharging the contact filters and at the same time dosing the sand filters.

The sand filters are four in number, each 64 feet square, and contain a total area of 0.37 acre. They are similar in construction, as regards the surrounding concrete walls, to the contact filters. Instead of concrete bot-

toms, however, the natural soil is to be shaped into ridges and valleys and is to contain four lines of 6-inch underdrains, 16 feet center to center, the whole to be covered with a layer of gravel up to the tops of the ridges, and on top of the gravel will be four feet of sand. The sewage is to be discharged at the center of each filter, the inlet being protected by a concrete slab. As the discharge from each contact filter serves to dose each sand filter, such dose will be comparatively large and will be sufficient to flood each of the sand filters to a depth of one foot provided it is all held on the surface of the sand at one time. This, however, will not be the case as it will take several minutes for the contact filters to discharge, and moreover, due to the low rate of filtration proposed, the applied liquid will promptly pass through the sand.

The rates of filtration proposed for the contact filters amount to only 500,000 gallons per acre per day or 1,000 persons per acre-foot, while the contact filter effluent will be treated on sand at the exceedingly low rate of 200,000 gallons per acre, corresponding to 2,000 persons per acre. There is no doubt, therefore, but that the plant is very liberally designed and with proper operation will serve the village for many years.

November 26th, 1910, the State Board of Health approved these plans for proposed sewerage and sewage purification for the village of Hudson, submitted October 26th, 1910, by Mr. D. M. Hosford, consulting engineer, provided:

1st. That samples of all filtering material be submitted to and receive the approval of the chief engineer of the State Board of Health before being placed.

2nd. That a detailed plan of the automatic controlling devices be submitted to and receive the approval of the State Board of Health before such apparatus is installed; and

3rd. That this approval be valid only until January 1st, 1912.

The consulting engineer was advised that the automatic siphons which control the discharge of the contact filters should be made of such size that the said discharge will occupy at least fifteen minutes in order to avoid flooding the sand filters. He was further advised to build the concrete walls surrounding the sand filters so that the tops of same will be one foot higher than the surface of the sand.

REPORT ON PROPOSED SEWAGE PURIFICATION FOR JACKSON.

On July 16th 1910, plans and specifications for sewage purification works for the village of Jackson were submitted by Mr. W. H. Monahan, village engineer. These were examined by the engineering department and were reported as follows:

Jackson is located in the south-central part of Jackson County, of which it is the county seat. The best estimate of the population that can be obtained would indicate 6,000 persons. The area within the corporation limits is approximately 1.7 square miles. The village lies in the valley of Salt Creek and the surrounding country is mildly hilly.

Jackson is primarily a manufacturing town and among its industries are blast furnace plants, foundries, pipe works, machine shops, car shops, lumber yards, and glass works. None of these concerns produce liquid wastes that would influence the problem of sewage purification. A part of the population is also employed in the mining of coal in and near Wellston, a neighboring town. There formerly existed coal mines near Jackson, but these have all been worked out.

Since 1900 Jackson has had a public water supply furnished by a private company. The supply is obtained from driven wells in the valley of Salt Creek several miles south of the village. No adequate records can be obtained of the water consumption, but it is estimated that about 3,500 persons use the public supply and that the average daily consumption is about 100 gallons per capita based on the above figure.

The general sanitation of Jackson is not good owing primarily to the lack of a proper sewerage system. This evil, however, promises to be in part done away with by the extension of the system of sewers that has now been begun. As lines of sewers are laid in the various streets, these will be paved. Paving improvement is one that has been neglected for a number of years owing to the prospect of sewerage being installed with the accompanying tearing up of streets.

PREVIOUS ACTIONS AND INVESTIGATIONS BY THE STATE BOARD OF HEALTH.

As early as 1901 plans for a system of sanitary sewers for Jackson were submitted to and approved by the State Board of Health upon the condition that sewage purification works would be constructed prior to the use of the sewers. When the proposition was submitted to a vote of the people, it failed to carry.

In 1904 a second attempt was made to secure the introduction of a system of sewers for the village and new plans were submitted to the State Board of Health. These plans included purification works consisting of septic tanks followed by aeration and intermittent filtration through slag filters. The plans were approved by the Board March 22, 1904, on the condition that samples of the filtering material satisfactory to the Board be submitted before the plant was built. This project also failed to carry on being submitted to a vote of the people.

Notwithstanding the popular apathy toward the installation of a sewerage system, the village officials have always been in favor of this improvement. After the project met with popular defeat in 1904, council undertook to provide for the construction of sewers with money obtained from the maximum bond issue that under the law could be

authorized by the body. Accordingly, during the year 1908, there were constructed three miles of trunk sewer. No connections were made to this sewer, however, nor were any laterals tapped into it. It was expected that the system would be extended by the construction of laterals as demanded by property owners.

On May 6th, 1909, complete plans for sewage purification works including a pumping plant were submitted to the State Board of Health. No action was taken on these plans owing to the fact that the village was unable for financial reasons to construct a plant at that time. On June 3rd, 1909, request was made by the then village engineer, Mr. J. W. Turner, for the construction of about three miles of lateral sewers approved in 1901 and the pumping station shown on plans submitted May 6th, 1909, the same to be used and the sewage to be discharged into Salt Creek until money could be made available for purification works. This plan was considered by the State Board of Health at its meeting held June 17th, 1909, and approval was granted on the following conditions:

“1st. That plans for a sewage purification plant be submitted to the Board for approval not later than December 1st, 1909 and that construction of the sewage purification plant be begun not later than April 15th, 1910.

2nd. That records be kept of all taps into the sanitary sewers.

3rd. That present connections to storm sewers be removed, and that further connections to same be strictly prohibited.

4th. That this approval be void after December 1st, 1909, unless construction of the pumping station and lateral sewers is commenced before that date.’

Owing to political changes, there was considerable delay in complying with the first condition of this approval. However, after some urging on the part of the State Board of Health, tentative plans were prepared by the village engineer so that the acting chief engineer of the Board was able to visit Jackson on March 17th, 1910, for the purpose of making an inspection on the ground and consulting with the village engineer relative to various details of the design. The plans then developed were a modification of those submitted May 6th, 1909. These comprised preliminary sedimentation, sprinkling filters composed of basic furnace slag, and final sedimentation. In view of various recent developments in sewage purification methods and also in view of local conditions, it was plainly evident that these plans were not satisfactory. It was therefore informally recommended that if possible a purification plant of the intermittent sand filtration type be constructed. This inspection was followed by conferences in the office of the acting chief engineer with the village engineer and other village officials on May 11th, 9th, and 23rd, June 26th, and July 11th. During these conferences it developed that an entire plant composed of intermittent sand filters because of local conditions would be very costly, and for this reason it became advisable to change the plans so as to comprise contact beds fol-

lowed by intermittent sand filters operated at a high rate. On July 16th, 1910, plans and specifications were submitted which form the basis of this report.

SEWERAGE SYSTEM.

That portion of the sewerage system which has already been built, namely, about three miles of trunk sewers and three miles of lateral sewers, seems to be of very poor construction as is evidenced by the large leakage of ground water. The amount of the leakage has not been ascertained but evidently is far in excess of the quantity of domestic sewage. It is the intention of the present village engineer to thoroughly inspect all of the sewers with a view to repairing and reconstructing such portions as are found defective, and also with a view to eliminating all connections admitting surface and subsurface drainage and roof water. This work is now under way. It is understood that before the purification works are built, a report of the results of the engineer's findings in connection with his inspections of the sewers will be submitted to the engineering department of the State Board of Health.

PUMPING STATION.

As it was not possible to secure a gravity outfall into Salt Creek for the main trunk sewer, it was necessary to install a small pumping station. Both the workmanship and design of this pumping station are crude, and it is quite probable that unless certain portions of the plant are adequately reinforced, it will collapse. Already it has been found necessary in order to protect the bottom of the sewage reservoir to reinforce it with about 20 cubic yards of solid concrete. Furthermore, the selection of the size of the pumping units was ill-advised when considered in connection with the fact that the sewage must be pumped to sewage purification works. The present village engineer proposes to remodel the pumping station as far as conditions will permit.

SEWAGE PURIFICATION WORKS.

Site. The site selected for purification works comprises about four acres of land in the northwestern part of the corporation and in the valley of Salt Creek. This land lies in what is known as the Wood-Coffman Addition, which is laid out in city lots but which in all probability will never be used for building purposes and at the present time is devoted to farming and grazing. It is about 1,000 feet distant from the pumping station and must be reached by a force main. The location of the site with respect to habitations is altogether favorable as the nearest house is at least 500 or 600 feet distant. The creek below the point of discharge passes through farming and pasture land and at times is dry. It is therefore apparent that any scheme for treatment of the sewage must effect a high degree of purification.

Quantity of Sewage. Before taking up the details of the design of the purification works, it will be necessary to consider the probable quantity of sewage that may be anticipated. As already noted, the sewerage system is not the result of a popular demand, but an attempt is being made to build it piece-meal as funds at the disposal of the council become available. It is not likely therefore that its use by the majority of the citizens will be brought about for a great many years. The first estimates of the number of persons that will use the sewers within the next ten years was placed at 4,000, but a further canvass has made it seem quite probable that not more than 3,000 persons will be tributary to the sewers within the period above mentioned. It is hardly reasonable to demand, therefore, that purification works larger than necessary to treat the sewage from this number of people be built.

General Features. The purification works will comprise three sedimentation tanks, four contact beds, and four intermittent sand filters. It is not expected that the funds available during the present year will permit the construction of more than one-third of the intermittent sand filter area, but as an assurance to the State Board of Health of their good intention in the matter, members of council have transmitted to the Board a statement to the effect that the money for completing the plant has been voted by that body and will become available in January, 1911. This statement is signed by the mayor and village clerk.

Sedimentation Tanks. The plans provide for three sedimentation tanks having capacities, respectively, of 17,600, 36,500, and 73,000 gallons, or a total of 127,100 gallons. Based on a sewage flow of 300,000 gallons per day, these tanks would give periods of sedimentation, respectively, of 1.41, 2.92, and 5.84 hours, or a total of 10.17 hours. The tanks are so arranged that the smallest may be used either in parallel or in series with the others. All of the tanks may be independently cut off. arrangements will be made for providing an even inflow and outflow across the width of the tanks. In front of the inlet and outlet ends will be placed hanging baffles for the purpose of assisting the distribution of sewage and for confining the scum. Near the center of each tank will be placed a sludge blow-off. The slope of the tanks toward the blow-off is on a grade of about four per cent. Over the tanks will be built a frame superstructure amply provided with light and ventilation.

Contact Beds. The plans show four contact beds, each 74 1/2 feet square and with an average depth of 5 2/3 feet. A small portion of one corner of each bed is occupied by a chamber containing automatic diverting apparatus, so that the total area is 0.508 acre. With these contact beds there will be a population tributary to each acre foot of 1,040, which is a conservative rating. Assuming a flow of sewage of 100 gallons per person tributary to the sewers, these beds will each receive about one contact of sewage per day. The contact material will consist of acid furnace slag from several old abandoned charcoal furnaces in the vicinity,

which it is believed can be obtained in sufficient quantity. This slag if of the proper quality should be a dense, dark colored, vitreous substance and not readily affected by the sewage. It differs greatly from the basic slag, which latter would not be at all satisfactory for the purpose. The sides and bottoms of the contact beds will be built of reinforced concrete. The enclosing and dividing walls will have a thickness of eight inches.

The sewage will be diverted on to and removed from the contact beds by means of automatic apparatus located in a central chamber. The type selected is that manufactured by the Ansonia Company and is actuated by the flow of sewage. This apparatus has not as yet been used in the state of Ohio but is said to be in successful operation elsewhere. Approval, however, should be conditioned upon the satisfactory operation of the apparatus under observation of a representative of the engineering department of the State Board of Health. The sewage will be distributed on the filters by means of 30-inch half tile laid diagonally across each bed. These tile will be filled with fine broken stone for the purpose of retaining the larger solid particles, thereby eliminating to a degree the tendency of the filters to clog. Furthermore, the tile will permit the fine broken stone to be easily removed when same becomes so clogged as not to permit ready passage of sewage into the filter. Very complete drainage for the contact beds is afforded by a system of vitrified pipe underdrains. In each bed these underdrains comprise one 10-inch main drain laid diagonally across the center of the bed with 4-inch tributary laterals entering from either side and placed in lines eight feet center to center.

Sand Filters. There will be four sand filters, each 91 feet long by 40 feet wide at the sand line. The total area will thus be about one-third acre. This area is not considered sufficient to adequately treat the contact bed effluent when the plant is operating at normal capacity, and it is therefore the intention of the village officials to add an additional two-thirds acre in 1911, at which time more funds will be available. The filters are so designed that this additional area may be added by simply removing one end embankment in each filter. The embankments will rise to a height of 18 inches above the surface of the sand and will have slopes of 1 1/2 to 1 above the sand line and 1 to 1 below the sand line. Before the sand is placed, the inner slopes of the embankments will be carefully sodded.

The filtering material will consist of a local sand, a sample of which on analysis gave an effective size of 0.26 m.m. and a uniformity coefficient of 1.81. From this it will be seen that the filtering material is of excellent quality for the purpose intended. Specifications prepared by the engineer, however, permit the contractor to use other grades of sand providing the effective size is between 0.18 and 0.45 m.m. and the uniformity coefficient does not exceed 3.

The total thickness of the sand layer as shown on plans is 3 feet.

Underlying the sand there will be a layer of gravel varying in thickness from 6 inches between underdrains to 12 inches at the underdrains. The variation in the thickness will result from the formation of the bottom of the beds into ridges and valleys, and the upper surface of the gravel will be made level. It is expected that the main body of the gravel layer will consist of stones varying from one-half inch in diameter to one and one-half inches in diameter, while the top inch or so will consist of a somewhat finer grade varying from one-fourth inch in diameter to one-half inch in diameter.

The underdrains will be four inches in diameter and will be laid in parallel lines 15 feet center to center. They will consist of vitrified tile pipe with bell and spigot ends, and the specifications permit of the use of seconds provided these are not broken.

The sewage will be distributed upon the surface of each filter by means of a system of wooden distributing troughs which will have two points of discharge, each point being placed in the center of an equal area. The quantity of sewage flow on to the bed at each point of discharge may be adjusted by means of hinged wooden diverting gates.

Sludge Bed. A sludge bed will be provided, 70 feet by 100 feet at the surface. This area is of such size that the entire contents of the largest sedimentation tank will cover it to a depth of 1.4 feet. The design of the sludge bed is essentially the same as that of the sand filters, but the filtering material will consist of very fine gravel. Before this material is placed, samples thereof should be submitted to the engineer of the State Board of Health.

Cost. It is anticipated that the total cost of the works as shown on plans will be about \$41,600, and that the cost of the present installation will be \$34,266.

July 23rd, 1910, the State Board of Health approved these plans submitted July 16th, 1910, by Mr. W. H. Monahan, village engineer, subject to the following conditions:

1st. That the proper operation of automatic apparatus for diverting the sewage on to and withdrawing the effluent from the contact beds be demonstrated to the satisfaction of the engineer of the State Board of Health;

2nd. That samples of all contact material and filtering material be submitted to and receive the approval of the engineer of the State Board of Health;

3rd. That there be maintained complete and readily accessible records of the location, purpose, and construction of all house connections made to the sewers;

4th. That as soon as the sewage purification works are completed, there be appointed by the village a competent person as superintendent of sewerage, whose duties it shall be to maintain entire supervision over

the sewerage system and sewage purification works and be responsible for their proper operation and maintenance; and,

5th. That this approval be considered void unless contracts for the construction of the works are awarded on or before September 1st, 1911.

REPORT ON PROPOSED SEWERAGE FOR A PART OF THE EASTERN SEWER DISTRICT OF KENTON.

On May 17th, 1910, a petition signed by twenty-five citizens of Kenton was received, protesting against a proposed sewer to be constructed by the city and to discharge into the Scioto River. A plan of the sewer was requested from the city engineer and was received on July 16th, 1910. On August 11th an investigation was made by the engineering department. The following report was submitted:

Owing to the nature of the topography, the present sewerage system of Kenton is divided into two main districts. The north district drains into a county ditch which is tributary to a branch of the Manmee River. The sewage from this district is treated, in a more or less efficient manner, at a purification plant. It is estimated that some 800 or 1,000 persons are tributary to the sewers of this district.

The greater portion of the city drains through combined sewers, built from time to time, into the Scioto River, with the result that the stream is badly polluted during dry weather. In 1903 plans for constructing a sewer in Leighton Street to drain a relatively small district were disapproved by the Board after being twice considered and in spite of urgent arguments on the part of local officials and citizens. Nevertheless, recent investigation has shown that notwithstanding the disapproval of the Board, this Leighton Street sewer was constructed two years later, in 1905.

The plan now proposed consists of the construction of a sewer in the alley between Main Street and Wayne Street, the sewer to discharge into the Scioto River at the foot of said alley. The sewer is to be 12 inches in diameter and 584 feet long, and there will be one catch basin at the head of the sewer to take the storm water from Walnut Street. The sewer will be utilized for domestic drainage from houses on Main and Wayne streets. The area of the district which would drain into the proposed sewer is 5.3 acres, and the population living on this area is about 100 persons.

The twenty-five citizens who protest against the construction of the sewer are said to be property owners in the district affected. The ground for complaint is that the discharge of sewage into the river at the point proposed will be detrimental to health and to the welfare of the city.

In view of the pollution of the Scioto River by the present sewers-

as demonstrated by the present and previous investigations of the State Board of Health, it would seem inadvisable to approve the discharge into the river of any more sewage. Although the district which would drain into the proposed sewer is relatively small, yet it is important that the city remove the present pollution from the stream by building an intercepting sewer and sewage purification plant; and this will probably not be done if small additional sewers to accommodate new districts are allowed to be built from time to time.

September 23rd, 1910, the State Board of Health disapproved the plan submitted by Mr. O. P. Wilson, city engineer, on July 16th, 1910, for this proposed sewer to discharge into the Scioto River between Main Street and Wayne Street.

The attention of the authorities was called to the fact that the Leighton Street sewer had been illegally constructed, as the plans for that sewer were disapproved by the State Board of Health. The authorities were also urged to take steps at once for providing a modern and efficient sewerage system for Kenton, including the construction of an intercepting sewer extending down the Scioto River to purification works.

REPORT ON PROPOSED PRIVATE SEWER AT LORAIN.

On June 3rd, 1910, a petition was received from Mr. A. Baldwin, of Lorain, accompanied by the approval of the board of health of Lorain, requesting approval by the State Board of Health for the construction of a private sewer within that city. On June 22nd, 1910, one of the assistant engineers visited Lorain for the purpose of making the necessary inspection. The following report was submitted:

Lorain, having a population of about 35,000, is located in Lorain County on Lake Erie and at the mouth of the Black River. Its sewerage has been constructed entirely on the combined plan and outlets have been established at various points along Black River and Lake Erie. Certain parts of the city along the river are too low to be drained by the sewers and consequently must depend upon surface drainage for the removal of storm water, and upon the use of cesspools for the disposal of sanitary sewage.

It is proposed by Mr. A. Baldwin to construct a private sewer to receive closet wastes from a hotel and saloon owned by him and located at 17-21 East Erie Avenue. The street in front of his building has been raised about 25 feet by the construction of a bridge, and this renders it impossible for him to secure drainage from his building into the city sewers. The present disposal of liquid wastes from the hotel is by means of a cesspool, which until recently overflowed into a swamp beneath the bridge. This swampy land is owned by the Baltimore and Ohio Railroad

and has been partially filled for the construction of railroad yards. The filling of the swamp has cut off the old outlet for the cesspool, and the overflow at present occurs near the hotel building. This condition has created an objectionable nuisance.

The ordinary population of the hotel building is about ten persons, and the maximum possible population is about 30. It is understood that the Baltimore and Ohio Railroad desires to connect into the proposed sewer for the purpose of providing drainage for the swamp area. No other connections to the sewer will be made. The outlet will be located on the west side of the Black River immediately north of the Erie Avenue Bridge. The additional contamination of Black River will not be appreciable when it is considered that the sewage from the greater part of Lorain is already received by that stream. Furthermore, the city will soon begin work on the relocation of the water works intake by which it will be carried to a point 1,200 feet beyond the present intake and considerably removed from the danger of pollution by the water from the Black River.

At a meeting of the State Board of Health, held June 30th, 1910, permission was granted Mr. Baldwin to construct this sewer.

REPORT ON PROPOSED SEWERAGE FOR UNITED STATES LIFE SAVING STATION AT LORAIN.

On March 19th, 1910, a communication was received from Mr. H. F. Brandebury, assistant superintendent of construction, United States Life-Saving Service, requesting approval of a sewer outlet into Black River. This communication was referred to the engineering department for investigation and report. The acting chief engineer being familiar with the general locality, a special visit in connection with this project was not deemed advisable. The following report was submitted:

The United States Life-Saving Station at Lorain, which is now under construction, is located on the shore of Lake Erie just east of the east breakwater at the mouth of the Black River. The station will normally comprise about ten persons. It is desired to install modern plumbing, and therefore some means of sewage disposal is necessary. It has been found impracticable to carry the sewage directly into the lake for various reasons; among the most important of these are the difficulty of maintaining the outlet clear of sand and other matter washed upon the beach, and of preventing its destruction by ice in winter. The only practicable method of caring for the sewage is to convey it through a neighboring dock and discharge it into the Black River at its mouth.

The waters of Black River, which receives practically the entire

sewage flow from the city of Lorain, are carried well into the lake by means of parallel breakwaters. Ordinarily the current in the lake and the prevailing winds convey these waters to the eastward, but occasionally they are blown toward the westward and drive directly over the intake of the city water works. As is well known, however, the public water supply of Lorain is filtered in a substantially constructed plant, which under its present management is producing efficient results. The occasional presence of Black River water about the intake renders rather difficult the treatment of the water, due both to excessive turbidity and contamination. It would on first thought, therefore, seem that additional contamination is not desirable. However, when it is considered that this additional contamination will come from but ten persons, whereas the city of Lorain has a population of 20,000 (the greater portion of which population is tributary to the sewers), it is apparent that the conditions will not be made perceptibly worse. Furthermore, the remedy for the menace to the water supply is the relocation of the water works intake rather than an attempt to limit the pollution of Black River by sewage, as the former can be very much more cheaply and readily carried out.

All things considered, it would seem advisable to grant the United States Life-Saving Station at Lorain permission to dispose of its sewage by discharging same in the crude state into the Black River near its mouth.

April 7th, 1910, the State Board of Health granted permission to construct and discharge a sewer and drainage system at the Lorain Life-Saving Station, as requested March 19th, 1910.

REPORT ON PROPOSED FILTERING MATERIAL FOR THE LOUISVILLE SEWAGE PURIFICATION PLANT.

On April 22nd, 1909, the State Board of Health approved plans for sewerage and sewage purification for Louisville, submitted by Mr. F. E. Myers of Canton, consulting engineer, subject to the following conditions:

1st. That the proposed plant be installed before any of the proposed sewers are placed in use.

2nd. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being placed.

3rd. That detailed plans of the pumping machinery and automatic controlling devices be submitted to and receive the approval of the State Board of Health before being installed.

4th. That this approval be void after May 1, 1910, unless construction of the works is commenced before that date."

With reference to investigating the character of the filtering material which it is proposed to use in the filters, the plant was visited on November 29th, 1910, by Mr. Josiah Hartzell, member of the State Board of Health, and the chief engineer.

It was found that all of the top soil from the site on which it is proposed to locate the sand filters had been removed, and that the natural material consists of an excellent grade of fine gravel and sand. Instead of using specially prepared material for the filters, it is proposed to construct them by using $3\frac{1}{2}$ feet of the natural unscreened material, over which will be placed $1\frac{1}{2}$ feet of sand.

In the case of two of the filters, the lower $3\frac{1}{2}$ feet will consist of natural material in its original position, whereas the remaining two or lower filters will consist of the same grade of material placed by means of scrapers.

As the natural gravel is loose and porous, it is believed that it will afford an excellent filtering material. It is probably superior in quality to some of the natural sand filter areas which are successfully operated in Massachusetts. Furthermore, the ample underdrainage system to be provided will aid in securing free passage of the sewage—especially at the low rates of filtration proposed.

December 7th, 1910, the Board approved the use of the natural gravel found on the site of the Louisville sewage purification works for filtering material, the lower $3\frac{1}{2}$ feet of the filters to consist of the unscreened material and the upper $1\frac{1}{2}$ feet of screened sand. This approval to fulfill Condition 2 of the approval of the original plans, April 22nd, 1909.

REPORT ON PROPOSED ADDITIONAL SEWERAGE FOR MIDDLETOWN.

On May 11th, 1910, a request was received from Mr. W. E. McElree, city engineer of Middletown, for approval of a proposed combined sewer to be laid in the southern portion of that city. The matter was referred to the engineering department and on May 12th an investigation was made. The following report was submitted:

Middletown has a present estimated population of about 12,000. The city lies in the northeastern part of Butler County in the valley of the Great Miami River. The greater portion of the city is built on flat bottom land on the eastern side of the river valley. This bottom land is composed of glacial drift deposits of sand and gravel extending to a great depth.

Middletown is primarily a manufacturing center and has a great variety of industries, including about eight paper mills, two of which have recently been completed; tobacco warehouses; a rolling mill; ma-

chine shops; carriage factories; etc. The paper mills produce large quantities of liquid wastes which are discharged into the Miami River. During periods of low water in the stream, these wastes may be traced for a considerable distance below the city by the discoloration produced. Paper mill wastes are not highly putrescible and for this reason no objectionable nuisance is created. It must be borne in mind also that the stream is a large one and has a watershed above Middletown of approximately 3,000 square miles.

Though practically all of the built up portion of the city is connected with sewers, the sewage has an almost negligible effect as regards the pollution of the stream. The existing sewers are all built on the combined plan and discharge into the river through five outlets. Three of these outlets, namely, those discharging at the foot of Second Street, Fifth Street, and Ninth Street, were built previously to 1893 and were therefore not brought to the consideration of the State Board of Health. The fourth outlet to be constructed, namely, that opposite Grand Avenue, was investigated by a committee of the Board in 1896 and approved conditionally. The letter of approval is as follows and shows very clearly the attitude of the State Board of Health at that time as regards sewerage for Middletown:

COLUMBUS, OHIO, December 14th, 1896.

"B. HARWITZ, Esq., *City Solicitor, Middletown, Ohio*:

DEAR SIR:—The State Board of Health has considered your application to approve the outlet of a proposed trunk sewer, to discharge into the Big Miami river on a line, or nearly so, with Grand avenue. The Board wishes to discourage the discharge of raw sewage into running streams and views with approval the plan of ultimately collecting all the sewage of Middletown at one point for the purpose of purification. Having in view the fact that the proposed sewer will carry but little household sewage for some years to come the outlet has been and is hereby approved, subject to the proviso that the city of Middletown will agree to purify its sewage in a manner satisfactory to the State Board whenever such purification shall be deemed necessary by the Board.

Yours truly,

(Signed) C. O. PROBST, *Secretary*."

By order of the Board.

The fifth sewer to be constructed, known as the Lakewood sewer, has just recently been completed and was installed for the purpose primarily of removing wastes from one of the newly built paper mills. The proposition was investigated by the State Board of Health at the time and was conditionally approved; the action of the Board was embodied in the following letter:

"COLUMBUS, OHIO, June 7th, 1909.

"To the Board of Public Service, *Middletown, Ohio*:

DEAR SIRS:—The State Board of Health has considered plans for proposed sewer for Middletown, as shown on plans submitted April 23rd, 1909, by Mr. W. E. McElree, city engineer.

You are hereby notified that said plans have been approved, provided:

1st. That the outlet be carried downstream to a point just below the discharge of the turbines of the Oglesbee Paper Company and the Paul A. Sorg Paper Company mills.

2nd. That the tops of all manholes be covered above the level of high water.

3rd. That an intercepting sewer be built and purification works be installed whenever in the opinion of the State Board of Health such works become necessary.

4th. That this approval be void after June 1st, 1911, unless construction of the sewer is commenced before that date.

Yours very truly,

(Signed) C. O. PROBST, *Secretary.*"

By order of the Board.

An inspection of the Lakewood sewer made at the time of the recent investigation brought out that all of the conditions of the Board's approval had been complied with.

Proposed Sewer. The present proposed sewer is designated as the Michigan Avenue sewer and is shown on the plans as extending from the Big Four Railroad in a westerly direction in Michigan Avenue to the Great Miami River. It is intended primarily for the purpose of receiving wastes and cooling water from a rolling mill now in course of construction, but in addition will remove storm water from an area of about 200 acres and sanitary sewage from the same area when it shall have become built up.

It is estimated that the total quantity of water used by the rolling mill will reach ten million gallons per day. Practically all of this will be used for cooling purposes, and it is stated by the city engineer that no acid iron wastes will be produced. The wastes, therefore, should not be objectionable, though they are likely to have a moderately high temperature, to contain more or less turbidity due to the presence of iron ore and dirt, and may possibly carry on their surface an oily film. The present population on the tributary area that will contribute sanitary sewage, does not exceed 500, but it is anticipated that the presence of the rolling mill will increase this population to perhaps several thousand.

The sewer will consist of 6,850 feet of concrete egg-shaped section, ranging in size from 5 feet 6 inches by 6 feet 6 inches, to 6 feet 6 inches by 8 feet. The total cost of the sewer will approximate \$84,000.

The point of outfall is directly on the bank of the Great Miami River about one-fourth mile south of the corporation line and about 1,800 feet south of the outlet of the Ninth Street sewer. There are no dwellings in the immediate vicinity and the low land near-by precludes the possibility of the neighborhood being built up. The flow of the stream at this point is amply able to take care without nuisance of any putrescible wastes that the sewer may carry.

At a meeting held June 29th, 1910, the State Board of Health approved these plans for additional sewerage, submitted by Mr. W. E.

McElree, city engineer, on May 11th, 1910, and known as the Michigan Avenue sewer subject to the following conditions:

1st. That necessary sanitary sewers be built and purification works be installed whenever in the opinion of the State Board of Health such works become necessary; and,

2nd. That this approval be void after January 1st, 1911, unless construction of the sewer is begun on or before that date.

REPORT ON PROPOSED SEWERAGE FOR MINSTER.

On June 2nd, 1910, a request was received from Mr. J. E. House of Wapakoneta, consulting engineer for Minster, requesting approval of plans for sewerage for a portion of Minster. On June 8, 1910, one of the assistant engineers visited Minster for the purpose of making the necessary investigation. The project was reported on as follows:

Minster is located in the southern portion of Auglaize County on the Miami and Erie Canal and has a population estimated at about 1500. The surrounding country is very flat, and drainage is difficult. The present sewerage facilities of the village consist of several short storm water drains discharging into the canal. These sewers are inadequate to remove the storm water flow and a very large part of the village is left completely without drainage.

Proposed Sewers. In order to provide means for drainage of the principal portion of the village, it is proposed to construct a system of storm water sewers with two outlets into the Miami and Erie Canal, located at Fifth Street and Third Street, respectively. The sewers are to be constructed of vitrified pipe laid with cemented joints and provided with trapped catch basins. The use of the sewers, it is understood, will be restricted by a village ordinance to prohibit the discharge of sanitary sewage into them. It was gathered from conversation with the local officials that cellar drains and sink drains would be permitted to discharge into the sewers.

The Miami and Erie Canal is totally unfit to receive wastes of any character without creating a decided nuisance. The discharge of storm water into the canal cannot be considered objectionable, but the discharge of sewage or even sink and laundry wastes must be considered decidedly so. Several of the existing storm water drains receive small amounts of domestic wastes, and the condition of the canal near the outlets of the sewers is very bad. The ordinance regulating the use of storm sewers should prohibit not only the discharge of closet wastes into the sewers but should also prevent the discharge of other liquid wastes. Cellar drainage should be accomplished by means of drain tile having no direct cellar connection.

From a rather intimate knowledge of conditions at Minster, it is quite certain that if the proposed storm sewers are built they will sooner or later be used for all domestic purposes; and though the village council proposes to pass an ordinance preventing the use of the sewers for receiving closet wastes or cesspools overflows, it has been the general experience that such ordinances are very difficult to enforce where householders have the privilege of discharging other domestic wastes into the sewers.

At a meeting held June 30th, 1910, the State Board of Health considered the approval of this proposed system of storm water sewers, with two outlets into the Miami and Erie Canal, located at Fifth Street and Third Street, respectively, and from the fact that existing storm water drains had been permitted to receive domestic wastes and had created nuisances in the canal near their outlets, the Board disapproved these proposed sewers until such time as the village should be able to install an adequate system of sanitary sewers that would take care of sanitary wastes. The authorities were advised that the Board desired that they should submit some definite plans for a proper system of storm water drains and sanitary sewers.

At a meeting of the State Board of Health, held July 27th, 1910, the mayor and a member of council, representing the village of Minster, appeared before the Board and asked that the Board's action disapproving the sewer plans submitted by Mr. J. E. House, consulting engineer, on June 2nd, 1910, be reconsidered.

The Board then approved these plans provided the council of Minster should pass an ordinance prohibiting the use of these sewers for sanitary purposes.

Such ordinance was passed by the council August 1st, 1910, and a copy filed with the State Board of Health.

NEW SITE FOR SEWAGE PURIFICATION PLANT FOR NEW PHILADELPHIA.

In the 1909 Annual Report of the State Board of Health will be found the report of an investigation of the pollution of the Tuscarawas River and nuisance caused by existing sewer outlets at New Philadelphia.

The Board found conditions detrimental to the health and comfort of people living near the outlets, and after giving the city solicitor, who represented the city, an opportunity to be heard, the Board postponed further proceedings against New Philadelphia under the Bense Act, provided:

(a). That the present sewer with an outlet into the Tuscarawas River near the foot of Front street be abandoned for house drainage or sewage; and

(b). That the city proceed without further delay to install the system of sewers and sewage purification in accordance with plans submitted to the Board by Mr. Paul R. Murray of New Philadelphia and Mr. E. G. Bradbury of Columbus, with permission, however, to construct in the beginning but four of the filter beds provided for the sewage disposal plant, and that such additional filters be constructed and placed in use as and whenever deemed necessary by the State Board of Health.

A great deal of difficulty was encountered in obtaining a title to the land selected as a site for the location of the sewage purification works, and on October 13th, 1909, a communication was received from the city solicitor, accompanied by a sketch, making request for the Board's approval of a new site not far removed from the original site proposed. In compliance with this request the acting chief engineer visited New Philadelphia on December 7th, 1909, to make the necessary inspection and reported: "The proposed site lies about 100 feet to the westward of the site originally proposed and in so far as proximity to habitations is concerned is more favorably located than the original site. It has a disadvantage, however, in the generally low surface level, which will have the effect of increasing the cost of construction and subjecting the plant to damages by floods. These are not serious objections, however, and can be overcome."

January 17th, 1910, there was received a sketch-map showing the old, and new sites together with numerous elevations of the surface of the ground.

At a meeting held January 20th, 1910, the State Board of Health considered the proposed site for sewage purification works as shown on the sketch-map submitted, and located a short distance to the westward of the site originally proposed, and the new site was approved subject to the following conditions:

1st. That the filter beds be placed at as high an elevation as is shown on the plans prepared by Mr. Paul R. Murray and Mr. E. G. Bradbury, already approved by the State Board of Health;

2nd. That the purification plant be surrounded by suitable and substantial levees which will effectively insure the safety of the works against the destructive action of floods;

3rd. That the plant be placed in service on or before January 19th, 1910.

At the meeting of the State Board of Health, held April 20th, 1910, the city solicitor of New Philadelphia appeared before the Board with a request that the authorities of the city be permitted to change the outlet and extend their sewer system with the privilege of omitting the construction of a sewage purification plant at the present time; and presented resolutions from the council, board of health, board of education,

board of trade and a petition from a large number of citizens of New Philadelphia in support of this request.

Upon consideration of the matter the Board voted to refuse the request and that the city be required to proceed with the building of this plant in accordance with the former order of the State Board of Health.

The authorities were notified that the Board would take proper action regarding the pollution of the Tuscarawas River above New Philadelphia whenever petitioned to do so under the provisions of the Bense Act.

REPORT ON PROPOSED STORM SEWER FOR PIQUA.

On October 18th, 1910, there was received from Mr. Albert Schroeder, city engineer, plan and profile of a proposed storm sewer. This plan was submitted to the engineering department and the following report was submitted:

The city of Piqua is located in Miami County, on the Great Miami River, covering an area of four square miles and has a population of 14,000. The most thickly populated portion of the city is provided with sewers built on the separate system and has a total length of six or seven miles. These sewers discharge into the Great Miami River through an outlet established previous to the time of jurisdiction by the State Board of Health over sewer outlets. The discharge at this point does not at present constitute a nuisance.

The plan now submitted provides for the construction of a storm water sewer, 48 inches in diameter at the lower portion, to discharge into the Miami and Erie Canal. The total length of the sewer is to be about 4,500 feet. It will be located principally in Madison Avenue and Vine Street, with a 15-inch branch extending northward through Locust Street, in order to drain Fountain Park, so-called.

Approval for the discharge of this sewer into Miami and Erie Canal has already been obtained from the State Board of Public Works, but the additional approval of the State Board of Health is desired.

The canal at present receives little, if any, pollution from domestic sewage. In order that the proposed sewer be used for storm water only, an ordinance has already been passed by the council prohibiting its use for sanitary drainage and providing a penalty of \$200 for so doing. A copy of this ordinance has been submitted with the plans.

At a meeting held October 20th, 1910, the State Board of Health approved the plans submitted October 18th, 1910, for this storm water sewer to discharge into the Miami and Erie Canal with the understanding that the approval would become void unless the said sewer is constructed before January 1st, 1912.

REPORT ON PROPOSED ADDITIONAL SEWERAGE FOR
SANDUSKY.

On May 19th, 1910, a communication was received from Mr. George Steinemann, city solicitor of Sandusky, accompanied by plans for a proposed sewer to be constructed in the southern part of the city. The matter was referred to the engineering department and an investigation was made by one of the assistant engineers on June 3rd, 1910. The following report was submitted:

The sewers of Sandusky have been constructed piece-meal as needed and generally on the combined plan. The entire sewage from the city, including manufacturing wastes, is discharged directly into Sandusky Bay through eighteen sewer outlets. Most of the sewage enters the bay along the city's northwest water front, but there are also several sewers discharging along the northeast water front. The discharge of sewage along the northeast water front has special significance with respect to the water works intake, since the sewage in finding its way out of the bay must under ordinary conditions pass over or very near the intake. The principal sewers on the northeast water front are those discharging at the foot of McEwen Street and at the foot of Arthur Street. The outlets of these sewers are, respectfully, 2500 feet and 3000 feet distant from the intake crib. It is also certain that at times the sewage discharged along the northwest water front is driven by winds over the intake.

In 1906 the sewerage of Sandusky was rather carefully investigated by the assistant engineer of the State Board of Health, and a report was submitted under date of June 29th, 1906, describing each outlet in detail. Since the preparation of this report a number of improvements have been made, but the general conditions are essentially unchanged. In the same year the Board approved the construction of a sewer in Adams Street with outlet into the bay at the foot of Warren Street. The foot of Warren Street is on the northwest water front but not very far from the point that separates it from the northeast water front.

PROPOSED SEWER.

In the extreme southern portion of the city, south of the L. S. & M. S. Railroad and east of the B. & O. Railroad, there is a fairly well built up district which is now having a moderately rapid growth. This district is at present inadequately drained by the natural surface runoff and during wet seasons much inconvenience is caused by the flooding of cellars and the impounding of water in the streets. Primarily for the alleviation of these conditions, but also for the purpose of removing sanitary wastes, the plans which furnish the basis of this report were drawn up. Anticipating possible objection on the part of the State

Board of Health, to the further discharge of sewage into Sandusky Bay on the northeast water front, the city engineer has prepared two sets of plans, which he has designated as propositions A and B.

Proposition A. This proposition calls for the construction of sewers within the territory bounded by the L. S. & M. S. Railroad on the north, Perkins Avenue on the south, Milan Road on the east, and the B. & O. Railroad on the west. A trunk sewer is shown which will conduct the sewage in a generally northeast direction for a distance of about $1\frac{1}{2}$ miles to Sandusky Bay at a point east of the easterly corporation line of the city and about seven-eighths mile southeast of the water works intake crib. This trunk sewer passes through a territory that may later on be extensively developed, and already there is a probability of the location within this territory of a large automobile factory which will give employment to perhaps 500 persons. Within the district to be relieved, however, there is now a population of about 400, and it is not likely that the ultimate population that will be tributary to the outlet will exceed 3,000. The ultimate capacity of the main outfall sewer is 68 million gallons per 24 hours, which is believed sufficient to care for the storm water flow of all the territory that can economically be made tributary to it. The size and length of the sewers that will be used are given in the following table:

12-inch vitrified sewer pipe.....	1,300 feet
12-inch vitrified sewer pipe	800 feet.
15-inch vitrified sewer pipe	900 feet.
18-inch vitrified sewer pipe	2,200 feet.

Total	5,200 feet.
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20 x 30-inch egg-shaped concrete sewer	2,300 feet.
14 x 24-inch egg-shaped concrete sewer	2,600 feet.
20 x 30-inch egg-shaped concrete sewer	2,300 feet.
20 x 40-inch egg-shaped concrete sewer	2,100 feet.

Total	9,300 feet.
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Grand total, 14,500 = 2.74 miles.

The total cost of construction is \$33,000.

Proposition B. This proposition provides for the construction at the present time of lateral sewers for approximately the same district as proposition A, but includes in addition a small portion of what is known as the Whiskey Run sewer district which lies on the west side of the B. & O. Railroad. It does not, however, provide for draining the large territory to the northeastward that would be taken care of by the construction of the trunk sewer under proposition A. Instead it is proposed to conduct the sewage to the southward through a short trunk sewer into Sulphur Brook or Pipe Creek, as it is sometimes called. The

sewer district comprised in this plan is but 90 acres in area with a present population of about 500. The ultimate population will probably not exceed 2,000. The total capacity of the trunk sewer will be about 6 million gallons per day, which is believed to be the maximum flow that can economically be drained into it. The length and size of sewers is embodied in the following table:

12-inch vitrified sewer pipe.....	2,300 feet.
15-inch vitrified sewer pipe	1,610 feet.
18-inch vitrified sewer pipe	2,781 feet.
24-inch vitrified sewer pipe	1,450 feet.

Total	8,181 feet.
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The estimated cost of this proposition is \$10,200.

In considering the sanitary aspects of the points of discharge contemplated in the two propositions it will be well to dispose of proposition B first. Sulphur Brook or Pipe Creek is a very small stream which in unusually dry seasons has no flow at all. Near the point of proposed sewer outlet and within a mile below the outlet there are at least 10 habitations. There is no doubt but that the discharge of sewage into this creek will cause it to become grossly contaminated and result in a great nuisance to those living near the stream. The stream ultimately discharges into Sandusky Bay, but it is not likely that the pollution will measurably influence the public water supply. In any event, the certainty of the creation of a local nuisance, should proposition B be decided upon, is sufficient to warrant its disapproval.

Referring now to proposition A, it will be noted that the point of discharge is such as to greatly menace the quality of the public water supply as drawn from the intake, yet for some years to come, at any rate, this influence would hardly be as great as that of the two existing sewer outlets on the northeastern water front. The merits of proposition A cannot be adequately discussed unless some consideration is given to certain features of the public water supply and past actions of the State Board of Health relative thereto. In July, 1907, previous to the construction of the present water purification plant, a committee of the Board, consisting of its then president and acting chief engineer, visited Sandusky and submitted a report, outlining very clearly the dangers of contamination of public water supplies by sewage, even though such supplies receive treatment in a purification plant. The report ended with certain conclusions which are quoted as follows:

"(1) No more unpurified sewage should be discharged into Sandusky Bay until an improved water supply is obtained.

"(2) The location of the water supply intake is such that, even with filtration, a safe and satisfactory water cannot be obtained at all times.

"(3) The water supply and sewerage situation at Sandusky is in an un-

satisfactory condition; and before the city spends money for filtration or other water works or sewerage improvements, it is important that the whole matter be carefully studied by an expert and that estimates be made of the cost and practicability of extending the intake to a location farther removed from the shore. Such location should be decided upon only after careful studies of the currents, and analyses of the water under different conditions. It may be found desirable to move the entire water works, including a future filtration plant, to a point two or three miles east of Sandusky and there extend the intake into Lake Erie.

"(4) After the best plans for ultimately obtaining a safe water supply have been worked out, all future additions and improvements to the water works should be made in a manner consistent therewith; although it may be impossible to complete the plans for some years."

The report was transmitted to the local officials but notwithstanding the advice therein given, the city proceeded in the preparation of plans calling for the use of the old intake. These plans were reviewed by the State Board of Health and approved with thirteen conditions relating principally to details of design. The purification works were built and have now been in operation over a year. The conditions of approval imposed by the State Board of Health have been essentially complied with, though certain portions of the plant have been built in an unsubstantial manner. While undoubtedly a very great improvement of the quality of the water has been effected by the purification works, yet the purity of the filtered water is far from meeting the highest standards. It has been found that the bacteria in the raw water sometimes number hundreds of thousand per cubic centimeter, and that even with liberal use of alum, the number of bacteria in the filtered water can still be counted in thousands per cubic centimeter. With careful and painstaking operation of the filter plant it may be possible to always secure a reasonably safe water, but the difficulties in doing this are so great that it is apparent that the recommendation of the Board's committee above quoted, namely, that the intake be extended to Lake Erie, was most wisely considered.

RECOMMENDATIONS.

From the foregoing it is plain that the discharge of sewage into Sandusky Bay is a menace to the quality of the public water supply, and that the discharge of additional sewage into the bay only increases this menace. On the other hand, Sandusky Bay is a large body of water and capable of receiving all the sewage of the city without creating offensive conditions, provided the outfalls are properly located and constructed. Further, in view of the unavoidable pollution which would reach the bay in any event, due to the natural surface drainage and the presence of numerous vessels, it would appear that the bay is after all the logical receptacle for the city's liquid wastes. For this reason the improvement of the water supply should not be dependent upon the elimination of sewage from Sandusky Bay, but rather upon an extension of the intake into

Lake Erie where the water may be had in a reasonable degree of purity. But the withholding of permission by the State Board of Health for the further discharge of sewage into the bay would have a tendency to enforce the improvement of the public water supply, and such action may be warranted as a means to an end. The whole problem, therefore, resolves itself into a question of policy on the part of the State Board of Health as to the best method of securing for Sandusky an improvement of the water supply.

At the meeting of the State Board of Health held July 27th, 1910, this report was received and no action was taken regarding the approval of the plans submitted May 19th, the Board wishing to give the authorities of Sandusky an opportunity to be heard. They were therefore notified of the date of the next meeting, July 27th, when they would be given such opportunity.

At the meeting of the State Board of Health held July 27th, 1910, Mr. George Steinemann, city solicitor; Dr. W. D. Hoyer, health officer; Mr. Robert B. Smith, city engineer, and many citizens appeared before the Board and were given a hearing.

In executive session the Board considered the question of approving the plans, submitted by Mr. Steinemann on May 19th, and voted to require the city of Sandusky to submit plans for a new water intake at the October meeting of the Board; and to withhold action regarding the sewer plan until that time.

REPORT ON PROPOSED SEWAGE PURIFICATION FOR SEBRING.

On February 23rd, 1910, plans and specifications for a proposed sewage purification plant for Sebring were submitted by Messrs. Holl and Starrett, of Canton, consulting engineers for the village. These plans were reviewed by the engineering department, and in connection therewith several inspections were made and four conferences held with the consulting engineers. The following report was submitted:

The village of Sebring is located in the southwestern corner of Mahoning County and lies near the headwaters of the Mahoning River. The community is of recent growth, having been established in 1900 as the result of the location at this point of several large pottery works. During the first few years of its existence, Sebring had a rapid growth. The present population is estimated at from 2,000 to 2,200, while future growth is problematical. By some it is claimed that the growth will be slight; by others that within the next ten years the population will have increased to 5,000. It seems, however, that any material future growth is contingent on the location in Sebring of additional industries. While

additional industries are at present being talked of, nothing definite has been decided in the matter. The village will probably never be a very large community, and it is believed that a sewerage system which will provide for an ultimate population of 10,000 is all that the village is warranted in installing at the present time. For sewage purification works, it is not believed advisable to make provision for a greater length of time than ten years. If the village does not acquire additional industries, it is fairly safe to assume that the population at the end of ten years will not exceed 3,000 or 3,500. With this population, it is not likely that more than 2,000 will be tributary to the sewers. The consulting engineers feel warranted, therefore, in designing a plant that makes provision for this number of persons.

The topography of the village site is very flat and the soil is principally of a clayey nature. The drainage passes into very small streams, entirely dry during a portion of the year, which rise in and near Sebring and which ultimately find their way after a few miles flow into the Mahoning River. Most of the objectionable drainage from the village, which includes considerable sanitary sewage from storm and private drains, finds its way into Sulphur Creek at a point, by water, but five miles above the intake of the Alliance water works. The wastes now entering the creek are undoubtedly a menace to the Alliance water supply, but it so happens that the stream receives considerable quantities of acid iron wastes from coal mines, which cause a marked degree of self-purification in the water under ordinary conditions of flow. Near the outlet of Sulphur Creek into the Mahoning River, analytical evidence reveals but a moderate degree of pollution. At times of sudden rise, however, much of the accumulated deposit in the stream is rapidly washed out, thus creating periods of special danger. It is plainly evident in the light of the above and also keeping in mind the increased quantity of sewage that will be produced, that the sewage purifications works should be designed to effect a high degree of purification.

SEWERAGE SYSTEM.

Before discussing in detail the sewage purification plant, it will be well to review the action of the State Board of Health in regard to the sewerage system. In 1904 the village engaged Mr. L. E. Chapin, consulting engineer, to design a system of sewers and sewage purification works. Plans were submitted to the State Board of Health and duly approved March 21st, 1904. The conditions of approval called for certain changes in the design of the purification works. These plans were never carried out for the reason that the people failed to vote the necessary bonds. The manner in which the system of sewers was to be constructed is well described in the report submitted to the State Board of Health by the consulting engineer, which reads as follows:

"The sewerage system proposed will be that of purely sanitary sewers, into which no storm or roof water will be taken; the pipe lines being from 6 to 15 inches in diameter and laid at an average depth of 8 feet. Manholes will be provided at all changes of grade and alignment, and automatic flush tanks located at the head of lateral sewers. These sewers will be mostly laid in the wide alleys, and all will be underdrained with hard tile drains, bedded in porous material to about 6 inches above the drains, and on which bed the pipe sewers will be laid.

The main sewer will be 15 inches in diameter, laid on a grade of one foot to the thousand and reaching the disposal lands at a point about 3,000 feet from the village limits and something over one mile from the main portion of the village.

The entire village lying low, with flat surface grades, and built upon a stiff clay soil, it is thought desirable to sub-soil drain all sewer lines so as to in a measure reduce the level of the ground water. This we propose to do by construction of hard tile drains under the sewer lines, and bed such tile in porous material of pottery waste, gravel or cinders, to a depth of 6 inches above the drain tile, and then bed the sewer lines on this material; these sub-soil drains to have an outlet into the creek above the disposal works."

It will be seen from the above that unusual precaution was contemplated in preventing the entrance into the sewers of ground water, thus placing as light a burden as possible on the purification plant. It should be understood by the village authorities that all sewers must be underdrained wherever ground water conditions are such as to make underdrainage necessary or advisable.

Another matter that requires attention in connection with the sewerage system proper is the existence in the southern part of the corporation of certain drains, originally intended for storm water purposes but which now receive considerable quantities of putrescible wastes. The sewerage system as shown on plans does not cover this territory and therefore approval should be conditioned on the extension of the system to include all objectionable liquid wastes produced within the village limits.

SEWAGE PURIFICATION WORKS.

Site. It is desired by the present consulting engineers to change the design of the sewage purification works, primarily for the reason that it has been found advisable from the point of view of economy and otherwise to adopt a new site for the location of these works. This site comprises a triangular tract of land about 24 acres in extent and lying adjacent to Yellow Creek and the Ashtabula and Alliance branch of the Pennsylvania Railroad. The site is well chosen for the purpose since there are but very few habitations within several thousand feet, while the nearest habitation is fully 800 feet distant. The elevation of the ground in the vicinity of the site varies from about elevation 80 to elevation 82, while the elevation of the bottom of Yellow Creek at this point is at about 78. The elevation of the invert of the outfall sewer is at 82.4. It will be seen that the difference in elevation between the sewer

outlet and the creek bottom is not sufficient to permit a gravity flow through the purification works, but it is intended to overcome this difficulty by materially deepening the creek and also by modifying its channel. Even so, the difference in elevation will be about the minimum permissible, and as will be seen later, the design of the plant must conform to meet this condition.

Quantity and Character of Sewage to be Treated. As already noted, it is not deemed advisable to install a purification plant to take care of the sewage from a greater population than about 2000 persons. With this population and assuming a moderate ground and storm water leakage into the sewers, there will result an average flow of about 200,000 gallons per day. This figure may therefore be taken as the nominal capacity of the plant. The sewage will be entirely domestic in character so that the problem of sewage purification at Sebring presents no unusual features.

Type of Purification Works. The method of purification adopted is intermittent sand filtration preceded by a period of sedimentation. The design has been largely governed by the very limited funds available. The principal features of the plant comprise a screen chamber, two sedimentation tanks, a dosing chamber equipped with automatic dosing apparatus, and six intermittent sand filters. These various devices will be taken up somewhat in detail in the following paragraphs.

Screen Chamber. The screen chamber is a small concrete structure 4 feet wide and 10 feet long. It has a sloping bottom which gives a depth at the inlet end of 2 feet and at the outlet end a depth of 3 feet. Two removable screens are shown, one placed beyond the other. Both screens are made up of $\frac{1}{2}$ -inch iron rods inclined at an angle of 45 degrees with the horizontal and toward the incoming sewage. The clear spacing between the iron rods is $1\frac{1}{2}$ inches in the case of the first screen and 1 inch in the case of the second screen. The screen will be so arranged that they may be readily cleaned by means of a rake. In the space beyond the screens will be placed a removable measuring weir held in ordinary stop plank grooves. At the lower end of the screen chamber and on either side thereof are two 10-inch openings controlled by shear gates which admit the sewage to the sedimentation tanks. On the whole, the screen chamber is well designed and should give satisfactory results.

Sedimentation Tanks. There are two sedimentation tanks provided, each of which is 65 feet long with an average depth of 6 feet. One of the tanks has a width of 22 feet, thus giving it a capacity of 64,000 gallons, and the other has a width of 12 feet, giving it a capacity of 35,000 gallons. The total capacity of the sedimentation tanks will therefore be about 99,000 gallons, which represents approximately twelve hours flow based on the nominal capacity of the plant. This period of flow is rather large, but the tanks were given the capacity in-

licated in order that they may still be of service if at a later period the sewage flow should be greater than that anticipated.

The tanks have been made of two sizes to provide some elasticity in their operation. Thus in the beginning it will be necessary to use only the smaller tank; later on the larger tank may be used alone; and finally, when the plant is being operated up to or beyond the present nominal capacity, both tanks may be used.

The sewage is admitted to the tanks from the screen chamber through distributing troughs which have four openings into each tank, these openings being spaced equidistantly across the width of the tank. The openings permit the entrance of sewage into the tank at about 2 feet below the flow line. There is thus obtained a fairly even distribution of the inflowing sewage. This distribution is further assisted by a hanging baffle placed $2\frac{1}{2}$ feet in front of the inlet end and extending to about mid-depth. In the middle of the outlet ends of the tanks are placed adjustable iron weirs having lengths at the crest of 3 feet in the smaller tank and 6 feet in the larger tank. Two and one-half feet in front of the outlet ends of the tanks are placed hanging baffles, also extending to mid-depth, which are expected to serve the purpose of keeping back scum and assisting the distribution of the sewage across the width of the tanks. To facilitate removing sludge when this may become necessary, the bottom of the tank is sloped from either end toward the center. This slope causes the center of the tanks to be depressed about 2 feet below the ends. This is believed to be sufficient to facilitate the flow of sludge. The bottom of the tanks being below the creek level, precludes the discharge of sludge from the tanks by gravity.

As the funds of the village are somewhat limited, the design was made as simple as possible, and it is expected that when sludge removal becomes necessary a temporary pumping outfit will be used. However, provision will be made for the future installation of permanent pumps by building at one side of the tanks a pump well and installing necessary valves and pipe connections. The pumps when installed may very conveniently be operated by means of a traction engine.

No provision has been made for a sludge bed, but it is expected that the sludge will be delivered into tank wagons or conveyed through suitable piping and applied to furrows on nearby land. Under the local conditions, this would seem on the whole to be a fairly satisfactory way of handling the sludge problem.

Dosing Chamber. In order to conserve as much head as possible, the dosing chamber has been given the very minimum depth at which automatic siphonic apparatus may be operated, namely, 18 inches. It consists of a square basin about 50 feet on the side with the corners cut off. Its total capacity is 27,000 gallons, which provides a sufficiently large dose to cover one of the filter beds to a depth of 3 inches. At one corner of the basin is placed the automatic dosing apparatus which con-

sists of three siphons arranged to discharge in rotation. These siphons will be housed in a superstructure which will afford plenty of light and permit free accessibility to all parts of the apparatus. In this connection might be mentioned the desirability of covering both the sedimentation tanks and the dosing chamber. The cost of doing this, however, would be quite large and may not be within the means of the village. Nevertheless, this should be kept in mind and if in the opinion of the consulting engineers the design may be modified to permit of such covering being built to greater advantage, it should be done.

Intermittent Sand Filters. The intermittent sand filters are to be built almost entirely in excavation. There will be six beds, each having an area of $1/3$ acre at the sand line, thus providing 2 acres of filtering area in all. The beds are in the shape of trapezoids with equal bases. The dividing and enclosing embankments will be made of earth obtained in excavation and will be placed in 6-inch layers and rolled. The embankments are to be 2 feet in height above the sand line and 5 feet in width at the top. The six beds are arranged in three groups of two beds each, and each group is tributary to one of the siphons in the dosing chamber. The discharges from the siphons enter manholes suitably arranged relative to each group so that the sewage may be diverted on to either filter of a group by means of hand-operated shear gates. This arrangement was adopted in order to avoid the expense of additional automatic apparatus. Since the dosing chamber is of such size that each filter bed will receive a dose once in about 19 or 20 hours with the plant operating at nominal capacity, it will be a simple matter for the attendant to visit the plant each day and change the valves in the manholes so that the beds are operated in rotation. At a later period, should it be found desirable, additional automatic apparatus may be installed to provide for the automatic dosing of all of the beds.

The bottoms of the filter beds will be graded to form a series of parallel ridges and valleys, the valleys being 6 inches lower than the ridges. The beds will have a minimum depth of 3 feet at the ridges and a maximum depth of 3 feet 6 inches over the valleys. The valleys will be 18.4 feet center to center and in them will be laid the underdrains. The underdrains will be 4 inches and 6 inches in diameter and will consist of ordinary vitrified sewer pipe laid with open joints. The lower portion of the filter beds will be filled with gravel. This gravel will have a minimum thickness at the ridges of 3 inches and a maximum thickness at the underdrains of about 6 inches. Over the pipe joints, the gravel will be piled somewhat higher than this. Superimposed upon the gravel will be placed the sand bed which will have a uniform thickness throughout. The grade of sand has not yet been selected but samples will be submitted to the State Board of Health for approval before the material is placed.

All of the underdrains unite in one main drain 15 inches in diameter

which conveys the effluent to the creek and discharges into it at elevation 76.50. The end of this pipe will be protected against back water by means of a flap gate. The elevation of the main drain outlet is but 18 inches higher than the bottom of the proposed deepened channel, but under local conditions this will no doubt prove to be a satisfactory arrangement. The watershed of the creek above the purification works is very small and floods are seldom of more than two days duration, so that even though the elevation of the water may at times prevent the passage of sewage through the filter beds, this will not be a serious matter since it will merely result in a somewhat protracted ponding of the sewage on the surface of the beds. As soon as the creek subsides, the sewage will pass through in the regular manner.

Provision is shown on the drawings for future extension of the filtration area. An increase by only one-half in the area is indicated, but it is believed that the lay of the land is such that the plant may be more than doubled.

These plans for a sewage purification plant for Sebring, submitted February 23rd, 1910, by Messrs. Holl and Starrett of Canton, consulting engineers, were approved March 26th, 1910, subject to the following conditions:

1st. That the sewerage system of the village be extended to collect all sewage and other putrescible liquid wastes now being produced within the corporation limits;

2nd. That permanent records be maintained showing the location and giving a description of all house and other connections that are made to the sewers;

3rd. That samples of all filtering material be submitted to and receive the approval of the engineer of the State Board of Health before such material is placed;

4th. That the purification plant be enlarged whenever the population tributary to the sewers shall exceed 2,000, or the sewage flow exceed an average of 200,000 gallons per day; and,

5th. That this approval be considered void unless contracts for the construction of the works are let on or before January 1st, 1911.

REPORT ON PROPOSED ADDITIONAL SEWERAGE FOR STEUBENVILLE.

On June 4th, 1910, there was received through Mr. J. N. Leech, city engineer, a request for approval by the State Board of Health of additional sewerage for Steubenville to serve a district in the southern part of the city. The matter was referred to the engineering depart-

ment and on June 21st, 1910, the acting chief engineer made an investigation on the ground. The following report was submitted:

Steubenville is a manufacturing community in the extreme eastern part of the state and on the banks of the Ohio River. The present estimated population is 20,000. The greater portion of the city has access to the sewers, all of which are built on the combined plan. Since 1893, sewers for nine sewer districts, each involving separate outlets into the Ohio River, have been submitted to and approved by the State Board of Health. In every case, however, conditions were imposed looking to the possible ultimate necessity of conducting all of the sanitary sewage to one point for purification.

The project now before the Board provides for the sewerage of Prospect Avenue in the extreme southern part of the city. This street winds along a steep hillside at a point where the sides of the valley approach close to the river. Three causes prompted the improvement: first, the street is badly in need of a substantial pavement, and this should properly be preceded by the placing of sewers; second, the topography is such that those living on the down-hill side of the road are seriously inconvenienced by the inadequate handling of ground water; and third, it is desired to provide sanitary drainage so that those residing in the neighborhood may enjoy the benefits of modern plumbing. The extent of the sewer district is not great as is indicated by the following list of materials called for by the plans:

- 600 feet 30-inch brick sewer.
- 400 feet 24-inch vitrified pipe sewer.
- 500 feet 18-inch vitrified pipe sewer.
- 6 brick manholes.
- 9 catch basins.

Not more than 150 live within the territory drained by the sewer and it is not likely after allowing for possible extensions of the sewer and probable increase of population within the next twenty-five years, that there will be more than 500 persons to whom the sewer will be available.

The proposed outlet for the sewer is into Wells Run, a small stream which skirts the hillside below Prospect Avenue and enters the Ohio River at the plant of the La Belle Iron Works. Wells Run, like many of the smaller streams tributary to the Ohio River, occupies a narrow ravine or hollow. After entering the city it passes through a rather inferior residence district until it reaches the La Belle Iron Works, at which point it enters a long large culvert under the works and extending to the river. All along the course of the run as it passes through the city its banks are used as dumping grounds, and owing to the fact that the city does not provide free collection of garbage, much of the material dumped is of a putrescible nature and extremely offensive. Refuse

of various sorts is dumped in such large quantities that the stream is markedly polluted thereby, but the water does not appear to be actually offensive. Wells Run is also at present contaminated by sewage, most of which enters through a sanitary sewer just below the Pennsylvania Railroad crossing and about 500 feet above the inlet to the culvert at the La Belle Iron Works. This sewage, which probably amounts to 200,000 gallons per day, greatly discolours the whole stream and a sewage stench is discernible amid the odors of decaying garbage, refuse, dead animals, etc. The other two sewer outlets are of minor importance and discharge very near the La Belle Iron Works culvert.

It is anticipated that within the course of a few more years conditions along Wells Run will be greatly improved by enclosing within a continuation of the existing culvert practically all that portion of the stream which passes through the built up part of the city. The matter of extending the culvert is a factor that must enter into a consideration of the point of outlet of the proposed sewer.

This point of outlet is about 400 feet above the sewer outlet at the Pennsylvania Railroad crossing and at a point where it cannot fail to add to the existing nuisance if the sewers are permitted to receive sanitary wastes. On the other hand, the extension of the outfall to the river or even to the culvert would involve large expense incommensurate with the benefit to be derived when it is considered that within a matter of a few years the creek will be enclosed. Again, gross nuisance may be prevented by forbidding the use of the proposed sewer for other than surface drainage by not permitting house connections until such time as the run at this point is enclosed by a suitable culvert.

At a meeting held June 30th, 1910, the State Board of Health approved these plans, submitted by Mr. J. N. Leech, city engineer, June 4th, 1910, subject to the following conditions:

1st. That no house connections be permitted until such time as Wells Run is enclosed from point of outlet of the proposed sewer to the Ohio River;

2nd. That should purification of the sewage of the city at any time become necessary, the city will make suitable alterations and extensions whereby all the sanitary sewage from the city may be conducted to a single point at a site suitable for purification works; and,

3rd. That this approval be considered void unless contracts for construction are awarded on or before January 1st, 1911.

REPORT ON PROPOSED SEWAGE PURIFICATION FOR CORRECTION SQUARE, WARRENSVILLE.

On July 30th, 1910, there were received from Mr. Robert Hoffman, chief engineer, department of public service of Cleveland, plans for a

sewage purification plant to be constructed for the city workhouse, known as Correction Square. In anticipation of plans being submitted, the acting chief engineer consulted with the chief engineer of Cleveland relative to the details of the plans and on June 1st, 1910, inspected the site upon which it is proposed to locate the plant. The plans were reported on as follows:

Correction Square at present or in the near future will have a population of 300, while a population of 700 is ultimately expected. The plant is designed to treat the sewage from the maximum population. At 60 gallons per capita, this population would produce a total flow of 42,000 gallons per day. The plant will be of excess capacity for many years, but in view of the fact that it is to be built by prison labor, it was thought advisable to build the full capacity.

The plant is to be located on the border of Mill Creek, some 900 feet from the institutional buildings, and there are no other houses nearer than this distance. The method of purification is first, screening; second, sedimentation; and third, intermittent sand filtration. The tanks are to be of concrete, and the sand filters will be enclosed by walls of the same material.

The sewage from the institution will pass through an 8-inch sewer to the screen chamber where are to be two iron screens consisting of $\frac{1}{4}$ -inch round iron bars, these bars being spaced in the first screen 2 inches center to center and in the second, $\frac{3}{4}$ -inch center to center. The sewage will then pass into a sedimentation tank holding 4,770 gallons or 2.7 hours flow based on the maximum capacity of the plant. From this it will pass into a dosing tank holding some 8,000 gallons, or a quantity sufficient to flood the sand filters to a depth of about 2 inches at each dose. The dimensions of the sedimentation tank are 15 feet by 8 feet by 7 feet, while those of the dosing tank are $23\frac{1}{2}$ feet by 15 feet by $2\frac{1}{2}$ feet.

The sand filters are five in number, each being 80 feet square, thus giving a total area of $\frac{3}{4}$ -acre. The bottom portion of the filters immediately surrounding the underdrains and to a depth of 6 inches between the underdrains will consist of graded screenings. Above this will be 4 feet of sand of approved quality. Each filter will contain six parallel lines of 4-inch underdrains laid 13 feet center to center, which will lead into a main underdrain 6 inches in diameter. The sewage will be distributed over the surface of the sand by means of wooden troughs which discharge on to concrete slabs at four different points symmetrically placed over the area of the filter. With the ultimate population, the filters will be operated at the conservative rate of 56,000 gallons per acre per day, or slightly less than 1,000 persons per acre.

In addition to the filters, there is to be a sludge bed 50 feet square, containing some 2 feet of sand. This bed will be at such an elevation

that it will receive by gravity the sludge from the sedimentation tank when it is desired to discharge same.

The plans are prepared with sufficient detail to enable the work to be carried out under the supervision of a city inspector, by the prison labor. As stated above, the plant is of ample capacity and the method is probably the most reliable with reference to producing at all times a satisfactory effluent. However, care must be taken in operating the filters so as to prevent undue accumulation of sewage on the surface of the sand and consequent odors therefrom.

September 3rd, 1910, the State Board of Health approved these plans for a sewerage purification plant for Correction Square, the city workhouse of Cleveland, located at Warrensville, submitted by Mr. Robert Hoffman on July 30th, 1910, provided:

1st. That samples of the sand to be used for filtering material be submitted to the engineer of the State Board of Health for approval before being placed; (Sample of sand No. 6 was submitted, and approved by the engineer September 27th, 1910).

2nd. That plans of the automatic dosing apparatus be submitted to the engineer of the State Board of Health for approval before being installed; (Blue print of the automatic siphon manufactured by Merritt & Company, was submitted and approved by the engineer on November 1st, 1910), and,

3rd. That this approval be void unless construction work has been begun by January 1st, 1912.

REPORT ON PROPOSED SEWAGE PURIFICATION FOR THE CLEVELAND COLONY FARM AT WARRENSVILLE.

On November 14th, 1910, there were received from Mr. Robert Hoffmann, chief engineer, department of public service of Cleveland, plans and specifications for a sewage purification plant for the city institution known as the Cleveland Colony Farm, located at Warrensville. These plans were referred to the engineering department, and the following report was submitted:

In November, 1905, the State Board of Health approved plans for a sewage purification plant for the tuberculosis hospital at the Cleveland Colony Farm, with the condition that the plant be increased in size as deemed necessary by the State Board of Health. Since the approval of these plans in 1905, several buildings have been added, including the "old couples' cottage," main infirmary building with north and south dormitories, and two lean-tos. The city workhouse, known as Correction Square, has also been completed at Warrensville, but this is provided

with an independent sewage purification plant, plans for which were approved in September, 1910.

The sewage discharged into the tuberculosis hospital sewer through the additional connection mentioned above amounts to more than the original plant constructed by the hospital in 1905 is capable of purifying, that plant having been built to accommodate not more than 125 persons whereas about four times that number are now tributary to it. That plant will be abandoned or reserved for emergency use.

The proposed new plant will provide for purifying the sewage of from 500 to 1100 persons. By actual measurement, the present flow has been shown to be about 36,000 gallons per day or 72 gallons per capita, and the new plant will have a capacity of 66,000 gallons per day. It is proposed to admit the roof water to the sewers.

The proposed plant includes a screen chamber, sedimentation tanks, and six sand filters. In addition there will be provision for the disinfection of the filtered sewage. The purified effluent will pass into the stream known as Tinkers Creek, which is tributary to the Cuyahoga River and which is not used for any public water supply. The location of the plant itself is to be some 1000 feet from the nearest building and well above high water level in the creek. The site is in every way very satisfactory.

The sewage on arriving at the plant through the extension of the existing hospital sewer, which extension is to be 10 inches in diameter, will first enter the screen chamber where are to be placed two parallel rod screens, the first having an open space of $1\frac{1}{2}$ inches and the second an open space of $\frac{1}{2}$ -inch.

The screened sewage passes through the sedimentation tanks which are $15\frac{1}{2}$ feet square with an average depth of 7 feet, having a total capacity of 12,000 gallons or about five hours' flow. The tanks are divided into two parts, one of which has a capacity of 8,000 gallons and the other 4,000 gallons or half that of the first. In this way there is obtained three possible sedimentation periods for a given rate of flow. Each of the divisions is provided with a sludge outlet in the center and lowest point, through which the sludge can be discharged into a 6-inch drain leading to the sludge bed. These are to be located within a few feet of the sedimentation tanks. The walls of the sedimentation tanks are of reinforced concrete.

The settled sewage will overflow from the sedimentation tanks into the dosing tank, which is built as part of the same structure. The dosing tank is 15 feet by 21.7 feet in plan, and the available depth below the discharging level will vary from 3 feet 6 inches to 5 feet. The maximum capacity of the tank is, therefore, 11,200 gallons, or sufficient to flood one of the sand filters to a depth of 2 inches at each dose. The dosing tank is also provided with a 6-inch drain leading to the sludge bed. The sedimentation tanks and the dosing tank are to be uncovered.

The sewage will be distributed upon the sand filters automatically by means of siphons or other apparatus to be located in the dosing tank. Plans for such apparatus will be submitted later.

The sand filters are six in number, each 90 feet square, giving a total area of 48,600 square feet or about $1\frac{1}{3}$ acres. The depth of the filtering material will vary from $5\frac{1}{2}$ feet over the underdrains to a minimum of 4 feet 3 inches between the underdrains. The bottom of the filters will be covered with a layer of gravel of varying depths but having a minimum thickness of 3 inches. The top of this gravel will be level and on top of it will be placed a layer of sand 4 feet deep at all points. The lateral underdrains are to be of 4-inch vitrified pipe, placed 15 feet center to center. The main underdrains will be from 6 inches to 10 inches in diameter. The sides of the filters will be formed of reinforced concrete walls 9 inches wide at the top and 5 or 6 feet in height. The natural soil, which is to form the bottom of the filters, is to be shape into ridges and valleys.

The rate of filtration, as will be noted from the above data, will be very conservative, it being necessary to treat not more than 60,000 gallons of sewage from 1000 persons on one acre of filters, and this after the sewage has been screened and settled. With ordinary care in operation, an excellent effluent should be obtained at all times; and furthermore, the liberal area provided will be advantageous in securing good results in the winter.

As mentioned above, there will be a sludge filter within a few feet of the sedimentation tanks. This filter will be 50 feet square and will contain 2 feet of sand.

No details are shown of the disinfection plant, and it is not stated whether this treatment will be used regularly. Nevertheless it is believed that sufficiently good results can be obtained without disinfection as a regular treatment; but it will be desirable to be equipped for the use of disinfectants in case the plant, for any unforeseen reason, should give poor results.

These plans, submitted by Mr. Robert Hoffman, chief engineer, department of public service of Cleveland, on November 14th, 1910, were approved by the State Board of Health December 3rd, 1910, provided:

1st. That samples of the filtering material be submitted to and receive the approval of the engineering department of the State Board of Health before being placed;

2nd. That details of the automatic apparatus for distribution on to the filters be submitted to and receive the approval of the State Board of Health before being installed; and,

3rd. That this approval be void after January 1st, 1912, unless construction is begun before that date.

REPORT ON PROPOSED SEWERAGE PURIFICATION FOR WILMINGTON.

On February 14th, 1910, Mr. L. L. Compton, village engineer, and Mr. J. C. Linton, village solicitor, presented preliminary plans for sewerage and sewage purification for Wilmington. A conference was held with the acting chief engineer, as a result of which revised preliminary plans were submitted by the village engineer on February 21st. These plans were reviewed by the engineering department and were reported on as follows:

Wilmington is in the central portion of Clinton County of which it is the county seat. The population as estimated from a recent school enumeration is slightly over 5,000. The area within the corporation limits is approximately 3 square miles. The topography of the village site is rolling and the drainage flows naturally into Lytle's Creek and several of its tributaries, two of which pass directly through the built up portion of the village. In general it may be said that the topography lends itself conveniently to the installation of a sewerage system.

A public water supply has been in use for a number of years, and this has encouraged the installation to a large extent of modern plumbing. In the absence of an adequate system of sewers, sewage and other putrescible wastes have been discharged largely into one of the branches of Lytle's Creek passing through the village, and this has resulted in a gross nuisance. Although Wilmington has a number of important manufacturing industries, it is understood that none of these produce liquid wastes that must be cared for in the city sewers. The problem of sewerage is therefore uncomplicated by manufacturing wastes that may prove difficult to purify.

Lytle's Creek and its tributaries have a very small flow, and therefore the installation of sewers must be at once accompanied by purification works. In compliance with recommendations made by the engineer of the Board, it was decided advisable to install a plant comprising sedimentation and fine grain filters of the intermittent type. As yet plans have not been submitted in full detail, nor is it thought advisable to prepare such plans until the necessary bond issue has been favorably voted on by the people. It is desired merely to have at the present time an expression from the State Board of Health relative to the general scheme proposed in order that estimates of cost, on which the bond issue must be based, may be made with confidence.

SEWERAGE SYSTEM.

The sewerage system is to be built on the separate plan. All sanitary and other putrescible wastes will be carried in the so-called sanitary sewers, while street washings, subsurface drainage, and roof water will

be carried in storm sewers. The sanitary sewers are to be so designed that all of the sewage will be conducted to a suitable site in the southwestern portion of the village for the location of purification works. These sewers will be constructed of vitrified sewer pipe and in a standard manner. It was stated by the village engineer that special attention would be given to the watertightness of the sewers and the elimination of possible ground water seepage, by suitable underdrainage. Manholes will be placed at all changes of grade and direction and in no case farther apart than 400 feet. Flush tanks will be placed at all dead ends. The sewers will vary in size from 6 inches for the short laterals to 18 inches for the main trunk sewer leading to the purification works. In no case will there be encountered any difficulty in securing ample gradients. The storm sewers will also be constructed of vitrified pipe and will be given outlets at convenient points into the nearest watercourses.

SEWAGE PURIFICATION WORKS.

Quantity of Sewage to be Treated. Before taking up the matter of purification, some consideration should be given to the quantity of sewage that may be anticipated. It is not believed advisable to install a plant designed to meet the demands of the village for a period of longer than ten years. Based on the past growth of the village, the population at the end of this period will be about 6,000. It is not thought that more than 5,000 persons will be tributary to the sewers. A liberal provision, therefore, will be the construction of a plant that can care for the sewage of 5,000 persons. Owing to the cost of the purification works, which is increased by the fact that the filtering material must be hauled from a considerable distance, it is desired by the local authorities that the size of the plant be maintained at the very minimum consistent with securing good results. To this end, as will be seen later, the filter area is somewhat less than desirable to meet the above conditions.

General Features. The main features comprised in the purification works are a screen chamber, sedimentation tanks, dosing chamber equipped with automatic dosing apparatus, and eight intermittent sand filters. It is believed that the plant can be placed at such an elevation that it will be in no danger from flood waters in Lytle's Creek. There is a possibility, however, that at times the sand filters will be thrown out of operation by flood waters, but this is not a matter of serious consequence since at such times the entire flow of crude sewage may be discharged into the creek without creating a nuisance. Furthermore, it is understood that floods in Lytle's Creek are seldom of more than a few hours duration owing to the small tributary watershed.

The details of the various devices above enumerated have not been fully worked out, but they may be described in a general way as follows:

Screen Chamber. The screen chamber is to be about 5 feet wide and 12 feet long and provided with two screens. The first or coarser

screen will have clear open spaces between the vertical bars of which it is composed of about one inch. The second or finer screen will have clear open space of about $\frac{1}{2}$ inch. Beyond the screens will be placed grooves for stop planks which will be used to support a suitable measuring weir in case it is desired to ascertain the quantity of sewage flowing.

Sedimentation Tanks. There will be two sedimentation tanks, one having twice the capacity of the other. This arrangement permits of some elasticity in the operation of the tanks. The total capacity of the tanks will be about eight hours flow based on a flow per capita of about 100 gallons per day. This period should be suitable for giving satisfactory sedimentation. The tanks are to be made unusually long and narrow, but the velocity in passing through them will not exceed three inches per minute. It is not believed that this shape of tank will prove a disadvantage, but rather that it will be conducive to efficient sedimentation.

Dosing Chamber. The dosing chamber will have a capacity such that its contents when full will cover one sand filter to a depth of about three inches, thus providing a satisfactory dose. The design of the dosing tank or the type of automatic apparatus to be used have not as yet been given consideration.

Sand Filters. The sand filters will have a total area of four acres and, as already noted, will be divided into eight beds. This is somewhat limited area for caring for the sewage of 5,000 persons, but it is believed that if the filters are well constructed and provided with filtering material of high grade, they may effect a reasonable degree of purification without being overloaded. Another argument in favor of this somewhat limited area is the probability that there will be somewhat less than 5,000 persons connected with the sewers at the end of ten years. Five thousand would represent nearly 80 percent of the population, whereas it is generally found, even in the larger cities, that only about 60 or 70 percent are connected with the sewers.

The several filter beds will be enclosed by concrete walls which will give them a neat appearance and insure them against being damaged by surface wash such as would obtain were they surrounded by earth embankments. The sand layer will have a minimum thickness of three feet, and this in turn will be underlaid by a substantial stratum of graded gravel to facilitate underdrainage. The underdrains will be made of vitrified tile pipe and will be placed in parallel rows about 15 feet center to center.

CONCLUSIONS.

The general scheme for the construction of sewerage and sewage purification works for the village of Wilmington is in accordance with good practice and should prove entirely satisfactory. Inasmuch as numerous details of the design may have an effect on the working of the

system, there should be submitted for the approved of the State Board of Health full detailed plans before construction is begun.

March 4th, 1910 the Board approved the general scheme for the installation of a sewerage system and sewage purification works for Wilmington, as shown on plans submitted February 21st, 1910, by Mr. L. L. Compton, village engineer, subject to the following conditions:

- 1st. That before any contracts are let, full detailed plans be submitted to and receive the approval of the State Board of Health; and,
 - 2nd. That this approval be considered as not in effect after January 1st, 1911.
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REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR THE REALTY TRUST COMPANY'S ADDITION AT YOUNGSTOWN.

On June 16th, 1910, plans were received from Mr. H. M. Reel, consulting engineer, for sewerage and sewage purification for the Realty Trust Company's addition to the city of Youngstown. Preliminary to the receipt of these plans a visit had been made to Youngstown for the purpose of inspecting conditions and some informal advice had been given in regard to the design of purification works. The following report was submitted:

The Realty Trust Company of Youngstown has recently placed on sale an addition located south of the south corporation line of the city between Market Street and Gibson Run, and it is desired to provide the conveniences of the sewerage system.

SEWERAGE SYSTEM.

The sewers are to be constructed on the separate plan and will consist of 1,500 feet of storm sewers, all of 12-inch vitrified sewer pipe, and 1,500 feet of sanitary sewers all of 8-inch vitrified sewer pipe. The former are to be laid with open joints and the latter with carefully cemented joints. The storm sewers will discharge directly into Gibson Run. The run, however, is of such small size that the discharge of sanitary sewage into it would create a gross nuisance, and for this reason sewage purification works are necessary. It is not anticipated that at any time the population of the addition will exceed 200, and it is therefore not deemed necessary to provide for a greater population than this in designing the purification works. Furthermore, it is expected that the city of Youngstown will at some future date construct a main sewer in the valley of Gibson Run, in which event the sewerage system of the addition will be connected with it.

SEWAGE PURIFICATION WORKS.

The purification works will comprise a sedimentation tank, a dosing chamber, and two intermittent filters composed of screened coke breeze.

Sedimentation Tank and Dosing Chamber. The sedimentation tank and dosing chamber are combined in one structure built of concrete. The sedimentation tank is 2 feet long by 7 feet wide and about 5 1-2 feet in depth to the flow line, thus giving a capacity of 6,350 gallons or a period of flow of about 7.6 hours based on a daily flow of 20,000 gallons. The inlet to the tank consists of a rectangular enclosed wooden flume placed at about mid-depth. Eight 3-inch circular openings in the side of this flume serve as outlets for the sewage into the tank. In front of these outlets is a hanging baffle which has the effect of breaking up currents and distributing the flow across the width of the tank. Near the outlet is a second hanging baffle, also intended to distribute the flow, but inasmuch as it is fully 3 feet from the end of the tank while the outlet is at one side of the tank, it is probable that its effect in distributing the flow will be small. An improvement in the design of the tank could be effected by providing troughs open at the top at the inlet and outlet ends. The openings in the trough at the inlet end should be placed flush with the bottom thereof and should preferably be larger than those shown on the plans in order to avoid clogging. The openings into the outlet trough may consist of two or three weirs equidistantly spaced across the width of the tank.

The discharge from the sedimentation tank will enter directly the dosing chamber. This chamber is 22 feet long, 14 feet wide, and has an effective capacity from flow line to depth drawn off by siphons of 10,350 gallons, or a storage period of 12.5 hours. The tank is of such size that if the contents thereof were discharged on to the surface of one of the filters, it would flood same to a depth of about three inches. The automatic apparatus consists of two siphons arranged to discharge automatically in rotation. Each siphon is connected with a separate filter bed.

Filters. Two filters are shown, each 45 feet wide by 100 feet long, the total area is thus 0.02 acre, which is equivalent to one acre per 1,000 persons tributary. The filters are surrounded by earth embankments having slopes above the sand line of 1 1-2 to 1, and slopes below the sand line of 1 to 1. The filtering material will consist of coke breeze, all of which will pass through a 3-4 inch screen. It is stated by the engineer that the greater portion of this coke breeze will be fine material, but comparatively clean and free from dust. The depth of coke breeze will be 3 feet. This will be underdrained by gravel varying in depth from 3 inches between underdrains to 6 inches at the underdrains. The size of the gravel is not stated, but should preferably vary 1-2 to 1 1-2 inches in size. Each filter has three parallel lines of under-

drains running longitudinally along the bottom. These are composed of 4-inch vitrified sewer pipe laid with open joints. The sewage will be discharged on to the surface of the beds by systems of wooden distributors having eight points of discharge on to the surface of each bed. Some provision should be made for regulating the quantity of sewage that may be discharged at each of these points. No provision has been made for the disposal of the sludge, as it anticipated that this can be conveniently handled on one of the filters.

At a meeting of the State Board of Health, held June 30th, 1910, these plans submitted June 16th, by Mr. Reel, were approved subject to the following conditions:

1st. That as soon as the work is completed a caretaker be appointed whose duty it shall be to visit the purification works at least once a day and maintain them in a manner satisfactory to the State Board of Health;

2nd. That an exact and readily accessible record be maintained of all house connections made to the system of sewers;

3rd. That samples of all filtering material be submitted to and receive the approval of the engineer of the State Board of Health before being placed;

4th. That the distributors for distributing the flow of sewage on to the surface of the filter beds be provided with a simple, adjustable arrangement whereby the flow at each point of outlet may be approximately equalized; and,

5th. That this approval be considered void unless construction is begun on or before January 1st, 1911.

The consulting engineer was advised that the following changes should be made:

That the inlet and outlet arrangements for the sedimentation tank be redesigned so as to provide a somewhat more even inflow and outflow across the width of the tank;

That a trough open at the top be placed across each end of the tank; the bottom of the trough to extend about 18 inches or 2 feet below the flow line;

That openings from the inlet trough be placed flush with the bottom thereof and made about 6 inches in diameter. The openings for drawing off the sewage into the outlet trough may consist of weirs; and,

That while it is not distinctly shown on the plans, it should be understood that the sludge drain will lead to one of the filter beds instead of the creek direct.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION WORKS FOR THE AMERICAN ENCAUSTIC TILING COMPANY AT ZANESVILLE.

On February 18th, 1910, there was received from Messrs. Waring, Chapman & Farquhar of New York City, civil engineers and contractors, a set of plans accompanied by a descriptive report for proposed sewerage and sewage purification works for the plant of the American Encaustic Tiling Company at Zanesville. The plans were referred to the engineering department and the following report was submitted:

The plant of the American Encaustic Tiling Company is in the northern part of the city of Zanesville on the western bank of the Muskingum River. The product of manufacture is ornamental tile. The present number of employees is about 600. The concern is a growing one and is expected ultimately to have 1,200 employees, but this number will probably not be reached before fifteen or twenty years to come.

The land occupied by the company is a triangular tract, about thirty acres in extent, lying between Linden Avenue and Wheeling & Lake Erie Railroad. The railroad at this point parallels the river and is directly on the river bank. The railroad and Linden Avenue converse at a point at the northern extremity of the tract. The buildings and other structures include a series of kilns, raw and finished stock buildings, warehouses, power plant, machine shops, and office buildings. These cover an area about 350 feet wide and about 1,200 feet long, extending along the east side of Linden Avenue and constituting a ridge about ten or fifteen feet higher than the remainder of the property. The area of this ridge is being extended toward the east by the dumping of large quantities of refuse tile.

The sewage from the company's plant is at the present time discharged into a large cesspool just eastward of the buildings, which cesspool is permitted to overflow on to the low-lying ground back of them. The overflow from the low-lying ground, which is somewhat swampy, is conveyed to the river through a 10-inch vitrified tile drain. This practice not only creates at times a local nuisance, but the inadequately purified sewage which is discharged into the river endangers the public water supply of Zanesville which is drawn from the river only one-fourth mile below though on the opposite side of the stream. The river at this point is held back by a dam so that during dry periods when the flow of the stream is small, the water is practically stagnant. At such times the wind may carry sewage from the tiling works directly over the Zanesville water works intake.

The water supply for the tiling works is obtained partly from the city of Zanesville, but largely from two 6-inch driven wells on the com-

pany's ground. As these wells are but 70 feet deep and extend through sand and gravel deposits, it is very likely that they also are endangered by the present method of sewage disposal.

The company now proposes to remedy matters on its own initiative by purifying the sewage from its plant. The project includes the building of a 24-inch storm water sewer to drain the low-lying portions of its property; a remodeling of its sanitary sewerage system; the abandonment of the cesspool; and the construction of a sewage purification plant comprising sedimentation tanks, contact filters, and intermittent sand filters.

SEWAGE PURIFICATION WORKS.

Site. The site selected for the purification works is on the low ground eastward of the buildings. This would appear to be a fairly favorable location since the nearest buildings other than those belonging to the company are fully 600 feet distant and on the opposite side of Linden Avenue with the buildings of the company intervening. About 100 feet southward is a sheet steel mill, and beyond this at a distance of about 1,400 feet is a residence. As a further precaution against the dissemination of odors, the plant will be so designed, as will be seen later, to prevent the exposure of crude sewage to the atmosphere. The elevation of the proposed site is 14 to 20 feet above low water in the Muskingum River. In case of extreme high water, the lower portions of this land are flooded. The final effluent drain will be placed at such elevation as to be above all ordinary high water but not above extreme flood stage.

Quantity and Character of Sewage. It is somewhat difficult to arrive at a knowledge of the quantity and character of the sewage that is to be treated. It should be borne in mind that the great majority of the employees are present at the works only during about ten hours of the day, and that the sewers are not used for ordinary domestic purposes. The main body of sewage comes from two latrines which are flushed every five minutes. The quantity of flush water used is 16,320 gallons in twenty-four hours. This is an excessive amount, and it is believed by the designing engineers that it can be reduced to one-third the above quantity. Some water is used in the weekly practice of flushing the sewer leading from the office building, and there are received the wastes from several water closets, a number of wash basins, and a small quantity of water from tile washing in the new wareroom; the last it is said carries no appreciable amount of sediment or chemicals. There is also a small quantity of sink waste resulting from the preparation of luncheons for the office employees.

The total number of employees, as already noted, is about 600. The designing engineers believe that they are making an ample provision for the future by allowing for 1,000 employees, or a sewage flow of

30,000 gallons per twenty-four hours. On this basis it is probably fair to assume that the sewage will approximate in character an ordinary domestic house sewage minus a considerable volume of laundry water and other soapy wastes. Such a liquid should, therefore, not prove difficult to treat by established methods, and moreover, fairly high rates of treatment should be permissible.

The several portions of the purification works may next be discussed in the order in which they are reached by the sewage.

Sedimentation Tanks. The plans show two sedimentation tanks, each 25 feet long and 8 feet wide, with an average depth of 5 1-2 feet. The inlet ends will be given a depth of 6 feet, and the outlet ends a depth of 5 feet, thus giving an ample slope to assist in the removal of sludge. The tanks are so arranged that they may be operated either in parallel or in series. According to the description of the plans, the latter method is contemplated as the usual mode of operation. The sewage is admitted into each tank through a gate controlled inlet placed in one corner of the inlet end. Diagonally across the corner of the tank and in front of the inlet is placed a hanging baffle extending to about mid-depth. This baffle is for the purpose of breaking up the flow and somewhat distributing the incoming sewage across the width of the tank. The distribution will no doubt be rather imperfect, but it is not anticipated that the results obtainable from the tank will be seriously affected. At about the middle of the tank will be placed a submerged baffle intended for the purpose of intercepting the sludge. It is not believed that this baffle is so placed as to prove of any material benefit, yet it cannot be considered as detrimental to the operation of the tanks. Across the outlet ends of each tank and about 2 feet therefrom are placed hanging baffles, also extending to about middepth. These will probably serve the purpose of assisting in drawing off evenly from the width of the tank to the outgoing sewage. In the middle of the end of each tank is placed an opening leading to a 6-inch effluent pipe. Between the two tanks and beyond the hanging baffle at the outlet end is placed a 6-inch crossover connection controlled by a valve. At the inlet end of the second tank and in the corner opposite to the inlet pipe is placed a 6 inch secondary outlet. With the crossover connection open, the sewage will flow to this outlet instead of to the outlets at the ends of the tank, and thence to the contact filters. Judging from the description given by the designing engineers, this will be the regular mode of operation. The tanks will have a total capacity of 16,500 gallons, representing on a basis of 30,000 gallons flow per twenty-four hours a period of sedimentation of 13.2 hours. This period is ample, and it may prove in the beginning that sedimentation in one tank will prove sufficient.

Provision is made for removing the sludge from the tanks through suitable outlets leading to a sludge disposal area. This area will be

formed by enclosing a suitable tract of natural ground by means of an embankment. On this area the sludge is expected to drain and dry, after which it may be carted away. During periods of sludge removal, it is probable that some odors will be caused, but with a well digested sludge, it is not anticipated that these odors will be great. This at any rate seems to be the experience at a number of places in Ohio where sedimentation tanks are used as a preliminary device to purification.

The covering provided for the tanks will consist of 2-inch planks 10 inches in width, laid across the tanks and supported at the top of the walls. It is intended to fasten these planks together in sets of four or five, which will render them somewhat less easily displaced and at the same time not cause their removal to be unduly difficult. The covering proposed, while not of the best, should prove satisfactory.

Contact Beds. There will be two contact beds, each having an area of 1,200 square feet, thus making a total area of 2,400 square feet or 0.055 acre. The working depth of the beds will be but 2 1-2 feet. These dimensions represent a rate of treatment of 545,000 gallons per acre per day, and 218,000 gallons per acre-foot per day. These rates are rather high and represent something over two contacts per day. However, considering the fact that subsequent purification is contemplated, the effluent obtainable should prove satisfactory. The contact material is to consist of refuse tile of a size and composition to meet with the approval of the State Board of Health.

A rather novel feature in connection with the contact beds is a so-called sedimentation space varying in depth from 6 inches to one foot below the level to which sewage is ordinarily drawn off in regular operation. The sedimentation space is provided with a series of parallel 5-inch horseshoe drain tile arranged in lines 2 feet center to center. These tile at one side of the bed discharge into a main 5-inch vitrified pipe drain leading to a blow-off chamber, the outlet to the drain being controlled by a valve. It is expected that much of the dislodged humus matter from the contact material will settle into this space instead of being carried out with the effluent, and that it can on occasion be blown out by simply opening the valve controlling the main drain in the blow-off chamber. It is very questionable, however, whether anything like a flushing velocity can be obtained, more particularly in the upstream ends of the laterals. It does not seem that this sedimentation space will prove of any real practical value. However, it cannot be considered a detriment to the operation of the contact beds, and therefore disapproval of the device would hardly seem warranted.

The sewage will be fed to each bed by means of a shallow trough extending along one side of the bed and formed in the surface of the contact material. This method of applying sewage to contact beds serves to localize clogging and conforms to most recent practice. The sewage will be automatically diverted and drawn off from the contact beds by

means of automatic dosing apparatus and siphons. The automatic diverting apparatus is of a design generally used by the designing engineers and consists in a tipping trough operated by means of floats. The rising of floats placed in chambers connected with the contact beds causes the trough to be alternately tipped from one bed to the other, thereby diverting the flow of sewage as each bed becomes filled. The siphonic apparatus is of the ordinary type and is arranged to discharge at a predetermined head. One siphon is used for each bed. The flow to the siphon is facilitated by a system of vitrified pipe underdrains placed above the blow-off drains in the sedimentation space above referred to.

Intermittent Sand Filters. The plans show two intermittent sand filters, each 70 feet by 80 feet and 3 feet in depth. This represents a total area of 0.257 acre. The rate of filtration with this area will be about 117,000 gallons per acre per day. Considering the previous treatment to which the sewage is subjected in sedimentation tanks and contact filters, this rate is conservative. It is proposed by the designing engineers to submit for the approval of the State Board of Health samples of the sand which they contemplate using before any of this material is put in place.

The underdrains for the sand filters will be of vitrified tile laid in lines 14 feet center to center. The tile will be placed in valleys parallel with and about 6 inches below ridges midway between the valleys. The bottom of the bed will be covered with a layer of gravel or other coarse material varying in thickness from 0 at the ridges to about 6 inches at the underdrains. This coarser material is placed for the purpose of facilitating underdrainage. The sewage will be conducted on to the surface of the bed by means of a system of wooden distributing troughs which will have four points of discharge on each bed. The beds will be surrounded by suitable sodded embankments. The main underdrain will unite at a manhole with the proposed 24-inch storm sewer. This manhole will give access for inspection and collection of samples. As already noted, the discharge of the main underdrain of the sand filters will be below extreme high water. It is believed, however, that such high water can continue but a few days, and that during such periods the sewage may be permitted to remain ponded over the surface of the filters. Should floods continue for a longer time, it will not prove objectionable under such conditions to discharge the contact filter effluent directly into the river.

A still further purification of the sewage has been suggested by the designing engineers, namely, that which may be obtained by dividing a tract of several acres adjoining the purification works into suitable areas by means of embankments, and arranging for the distribution of sewage on to these areas in rotation. The areas will be underdrained with field tile which will presumably lead to the river. Such a scheme if it could

be kept constantly in operation would furnish an absolutely complete protection against contamination of the river, but it hardly seems worth while for the reason that the area lies so low that even moderate rains would cause it to become water-logged.

The plans for proposed sewerage and sewage purification works for the plant of the American Encaustic Tiling Company at Zanesville, submitted February 18th, 1910, by Messrs. Waring, Chapin & Farquhar of New York City, civil engineers and contractors, were approved April 2nd, 1910, subject to the following conditions:

1st. That samples of all filtering material be submitted to and receive the approval of the engineer of the State Board of Health before this material is placed;

2nd. That the capacity of the purification plant or any of its parts be increased when in the opinion of the State Board of Health such increase becomes necessary; and,

3rd. That this approval be considered void unless construction is begun on or before January 1st, 1911.

REPORT ON PROPOSED ADDITIONAL SEWERAGE FOR ZANESVILLE.

In the early part of April, a request was made through Dr. J. C. Crossland, President, for the approval by the State Board of Health of a sewer in the Southwestern Sewer District of Zanesville to be constructed by Mr. M. O. Kelly and other property owners within this district. The matter was referred to the engineering department and an investigation was made on May 25th, 1910. The following report was submitted:

The southwestern Sewer District of Zanesville in which the private sewer is to be located is not provided with a sanitary system of sewers. On January 24th, 1908, general plans for sanitary sewers for the southwestern portion of Zanesville were submitted. The territory to be sewered included that portion of the city lying south of the Licking River and southwest of the Muskingum River. It was proposed to locate the outlet on the west bank of the Muskingum River a short distance below its confluence with the Licking River. These plans were approved and the following letter was sent:

"COLUMBUS, OHIO, June 24th, 1908

To the Board of Public Service, Zanesville, Ohio.

DEAR SIRS:

At a meeting of the State Board of Health, held June 17th, 1908, plans for a sanitary sewerage system for the Southwestern Sewer District, Zanesville, as

shown on a general plan submitted January 24th, 1908, and on detail sheets submitted April 16th 1908, by Mr. Henry I. Buell, designing engineer, were considered.

You are hereby notified that these plans were approved.

Yours truly,

(Signed) C. O. PROBST,
Secretary."

For financial reasons nothing has been done toward the construction of sewers as planned for this district. This portion of Zanesville, which includes some very good residential districts, is at present wholly without sewerage facilities.

The properties owned by Mr. M. O. Kelly and others which it is desired to sewer are located in the block bounded by West Main Street, Melrose Avenue, Osage Street, and Young Street. The total area is 1.85 acres which is divided into 20 lots, all of which are occupied by well built dwellings. All of the dwellings are comparatively new and are equipped with modern plumbing conveniences, the disposal of the wastes from which has occasioned some trouble in the past. The sewage has always been discharged into loosely walled cesspools which owing perhaps to the clayey soil have rapidly become clogged. Owing to the small size of the lots difficulty has been experienced in finding sufficient area for the construction of new cesspools when the old ones have been abandoned. It has therefore been decided by the property owners to construct a private sewer to receive the sanitary wastes from their homes and discharge it into the Licking River.

The proposed sewer is to be constructed of vitrified pipe, laid with cemented joints, and is to have a total length of about 800 feet. The point chosen for an outlet is on the south bank of the Licking River opposite Osage Street and about 60 feet north of West Main Street. The river at this point is about 100 feet wide and consists of backwater caused by a dam located at its mouth 2,200 feet below the proposed outlet. The current in the stream on the day of investigation was about 2-3 foot per second.

The construction of this sewer is intended as a temporary relief to be used until the southwestern sewer district is adequately sewered. Permission has been obtained from the city of Zanesville to construct the sewer and the city engineer is to give lines and grade with the idea that the private sewer may connect with the city sewerage system when the same shall have been constructed. It is not, however, likely that the sewers in the southwestern district will be constructed for several years. The flow of the Licking River at all times is sufficient to care for the sewage from this small district without creating objectionable conditions. On the other hand, the flow of the river is not great enough to sufficiently dilute all of the sewage from the southwestern district that might be drained into it, were this district completed sewered. The construction of the present proposed sewer should, therefore, not necessarily

be considered as a precedent for granting permission to other persons for constructing temporary outlets into the Licking River.

At a meeting held June 30th, 1910, the State Board of Health approved this proposed sewer, serving the territory bounded by West Main Street, Melrose Avenue, Osage Street and Young Street, subject to the following conditions:

1st. That the sewer be built in full conformity with plans on file in the office of the city engineer of Zanesville, and with a view to ultimately connecting said sewer with a comprehensive system of sewers for the Southwestern Sewer District, which will have its point of discharge into the Muskingum River;

2nd. That the temporary outlet be extended well into the channel of the stream where the sewage may always be discharged into a good current of water and at an elevation below low water; and,

3rd. That this approval be considered void unless construction is begun on it before January 1st, 1911.

INVESTIGATIONS UNDER THE BENSE ACT

(99 Ohio Laws, Page 74, Sections 1249-1261 inclusive, General Code.)

REPORT ON THE SEWERAGE OF ADA WITH RESPECT TO THE POLLUTION OF THE WATER SUPPLY OF LIMA.

On October 18th, 1910, there was received from H. J. Lawlor, clerk of the board of health of Lima, the following petition:

"To the Ohio State Board of Health.

I, the undersigned, clerk of the board of health of the city of Lima, Allen County, State of Ohio, do hereby certify that the board of health of said city, being in session on the 5th day of August 1910, adopted a resolution of which the following is a true copy.

Resolved, That the village of Ada, located in Hardin County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into Ottawa River, and by reason thereof has polluted said stream, which is the source of the public water supply of Lima, thereby creating conditions that are detrimental to the health and comfort of the citizens of the said city of Lima, Allen County, Ohio.

The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said city of Ada to install such works, or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said board, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

(Signed) H. J. LAWLOR,

Clerk Board of Health, Lima, Ohio."

Dated at Lima, Ohio, this 15th day of September 1910.

On October 20th, 1910, the president of the Board appointed an investigating committee consisting of Mr. John W. Hill, member, together with the chief engineer. This committee visited Lima and Ada on November 18th, 1910, and with the city officials of Lima inspected the sewer outlets at Ada complained of in the above petition.

After this inspection, the committee, being of the opinion that the city of Lima should first take steps toward purifying its water supply before attempting to compel Ada to purify its sewage, submitted an informal statement to the State Board of Health recommending that action against Ada be postponed until the Lima health authorities had had an opportunity to make complaint against the water supply of their city.

On December 2nd, 1910, there was received from the Lima board of health, a petition asking that the city be compelled to purify its water supply. The following report, therefore, was submitted in regard to the Ada sewer outlets, based on the recent inspection of the committee as well as on reports of the engineering department made in previous years.

Ada is a village of about 3,000 population located in the northwestern portion of Hardin County near the headwaters of the Ottawa River. The surrounding country is very flat and has a clayey or shaley soil underlaid by limestone at a depth of only a few feet. The village is

drained by several ditches which find their way by circuitous routes into Ottawa River, or Hog Creek as it is called in this neighborhood, which runs from east to west about a mile to the north of Ada. This stream is used by Lima, some twenty miles below as a source of public water supply. The water is pumped only during high stages of the stream and is stored in a very large reservoir holding over a year's supply. The sewers of Ada have been constructed as needed, usually of open jointed vitrified sewer pipe, and sometimes of ordinary field tile. These sewers were intended originally for storm water, but were soon used for carrying off overflows from cesspools.

Until 1904 sewage was discharged into three of the ditches above referred to and found its way ultimately into Ottawa River. As the grade of these ditches is but slight, sewage from the outlets stands in stagnant pools, emitting very foul odors, and is carried off only at times of heavy rains. In 1902 it was proposed by the village to conduct the sewage from two of the westerly outlets to Ottawa River in a sewer constructed of open jointed field tile. The sewer as designed was to have one line of 24-inch tile for a part of the way and two lines for the remainder of the distance. On August 11th, 1902, the engineer of the Board visited Ada and made an investigation in connection with the proposed sewer. His report indicated the danger to the Lima water supply of discharging wastes into the Ottawa River, and also pointed out that only vitrified sewer pipe with well made joints should be permitted to carry off sanitary drainage. The Board accordingly voted to disapprove the proposed sewer with outlet direct into the Ottawa River, and the village was so notified on October 20th, 1902.

Subsequently the village obtained engineering advice on the construction of a system of sanitary sewers with purification works. It was found that the installation of purification works would involve pumping the sewage, which was deemed by the village authorities to entail a prohibitive expense.

In 1904 the village again petitioned the State Board of Health through its solicitor to be permitted to construct a sewer discharging directly into the Ottawa River. After a reconsideration of the matter, "it was voted to reaffirm the Board's former action disapproving the turning of raw sewage into Hog Creek." The Hardin County authorities were then appealed to by the village and the sewer was constructed by them without further reference to the State Board of Health.

An examination of the sewer showed that it has been constructed essentially in the manner first proposed, and that the work is very 'poorly done. In portions near the outlet the tile is laid quite near the surface and is broken through in numerous places. It is believed that this sewer receives the overflow from at least fifty cesspools and probably more. The sewage as it appeared at the outlet on the day of the last inspection was fairly clear and gave off very little odor. There was distinct evi-

dence, however, of sewage about the outlet, and the analyses of the flow in this sewer, made four years ago, showed it to be badly contaminated.

The other sewer outlet of Ada is located about one mile east of the village and discharges into Grass Run, a tributary of Hog Creek or Ottawa River. This outlet, owing to the circuitous course of the stream, is by water four or five miles farther removed from the Lima water supply than is the northerly outlet. This easterly outlet receives most of the sewage of the village and has been a source of complaint on account of foul deposits near the point of discharge, and the odors arising therefrom. There is no doubt that this sewer outlet constitutes a distinct local nuisance, as well as affording danger to the Lima water supply. This sewer was formerly known as the "old stone sewer" and was originally built more than twenty-five years ago. The sewer was rebuilt with sewer pipe, however, two or three years ago, without the approval of the State Board of Health. The question as to whether this remodeling should have been submitted to the State Board of Health for approval, under the law existing at that time, is probably open to discussion.

CONCLUSIONS AND RECOMMENDATIONS.

Your committee herewith concludes that the village of Ada is permitting sewage to be discharged into Ottawa River and Grass Run, one of the tributaries thereto, and is thereby polluting the source of water supply of the city of Lima.

It is recommended that the village officials of Ada, in case the Board adopts the report of this committee, be notified of the findings of the Board and be given an opportunity to be heard in Columbus on January 25th, 1911, and to show cause, if any, why immediate steps should not be taken toward purifying the sewage of the village.

(The following order of the State Board of Health, approved by the Governor and the Attorney General, was issued in 1911, but is made a part of this report in order to complete the record. — ED.)

After giving the authorities an opportunity to be heard the Board adopted the report of its committee and the following order was sent to the Mayor and Council of Ada, February 25th, 1911:

AN ORDER OF THE STATE BOARD OF HEALTH TO THE VILLAGE OF ADA.

WHEREAS, The State Board of Health of the State of Ohio, having under consideration the conditions set forth in a complaint of the board of health of Lima, Allen County, Ohio, that the village of Ada, Hardin County, Ohio, is polluting the water supply of Lima, made to said State Board of Health in writing, as required by Section 1 of an Act of the General Assembly of Ohio, entitled, "An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution," passed April 7th, 1908 (99 O. L., p. 74), did in accordance with the duties imposed upon said Board by said act, pursue all and singular the requirements and duties to be performed

by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint, and

WHEREAS, The State Board of Health, after investigating the conditions complained of, found that the village of Ada, Hardin County Ohio, is discharging and permitting to be discharged sewage into the Ottawa River and Grass Run, one of the tributaries thereto and by reason thereof is polluting the source of the water supply of the city of Lima, Ohio; and

WHEREAS, Acting pursuant to the requirements of the act aforesaid, said State Board of Health thereupon on the 13th day of January, 1911, notified the the authorities of Ada, Hardin County, Ohio, of its said findings, and gave said village an opportunity to be heard before said Board, and

WHEREAS, On the 25th day of January 1911, pursuant to said notice, there appeared before the State Board of Health Mr. T. J. Small, engineer, and Mr. S. P. Axline, solicitor, representing said village, and the matters as contained in said complaint were then discussed and argued by them in the presence of said Board, and

THEREUPON, After such hearing and argument the State Board of Health found and determined that the improvements and changes in said conditions aforesaid were necessary and should be made; to-wit: That the village of Ada should be required to purify its sewage in a manner satisfactory to the State Board of Health within five months from the date this order of the State Board of Health is approved by the Governor and the Attorney General.

THEREUPON, On motion duly seconded, the report and finding of said State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of the State of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

February 10th, 1911.

(Signed) C. O. PROBST,
Secretary of State Board of Health
of the State of Ohio.

COLUMBUS, OHIO, February 24th, 1911.

The foregoing report and findings having been examined by us, respectively, the Governor of the State of Ohio, and the Attorney General of the State of Ohio, the same are in all respects approved this 24th day of February, 1911.

(Signed) JUDSON HARMON,
Governor of Ohio.

(Signed) TIMOTHY S. HOGAN,
Attorney General of Ohio.

AN ORDER OF THE STATE BOARD OF HEALTH REQUIRING THE AKRON WATER WORKS COMPANY TO FURNISH THE CITY OF AKRON A SATISFACTORY WATER SUPPLY.

In the 1909 report of the State Board of Health will be found the report on the investigation of the water supply of Akron made under section 1249 of the General Code. The Board found that certain

changes or improvements were necessary but postponed further action pending the outcome of a suit against the water company which might enable the city of Akron to secure a pure and suitable water without action by the State Board of Health. The decision of the court was, however, against the city, and the Board then issued the following order to The Akron Water Works Company, October 3rd, 1910:

AN ORDER TO THE AKRON WATER WORKS COMPANY.

WHEREAS, The State Board of Health of the State of Ohio, having under consideration the conditions existing in the city of Akron, Summit County, Ohio, as regards the pollution of the public water supply as set forth in the complaint, in writing, made to said State Board of Health by the board of health of the city of Akron, and as required by section 2 of an act of the General Assembly of Ohio entitled "An act to authorize the State Board of Health to require the purification of sewage and public water supplies and to protect streams against pollution," passed April 8th, 1908 (O. L. 99 p. 74), did, in accordance with the duties imposed upon said Board by said act, pursue all and singular the requirements and duties to be performed by said State Board of Health, and

WHEREAS, The State Board of Health, after investigating the conditions complained of, found that the present water supply of the city of Akron is polluted and thereby dangerous to health, and

WHEREAS, Acting pursuant to the requirements of the act aforesaid, said State Board of Health thereupon on the 9th day of November, 1909, notified the Akron Water Works Company and the authorities of Akron of its said findings, and gave said company and officials an opportunity to be heard before said Board on the 19th day of January 1910, and

WHEREAS, On the 20th day of January 1910, pursuant to said notice there appeared before the State Board of Health the following representatives from Akron: N. M. Greenberger, city solicitor; Jonathan Taylor, assistant solicitor; N. O. Mather, State senator; H. E. Andress, and W. E. Young, attorneys for the water company; W. G. Smith, Detroit, Michigan; R. A. Myers, member of the chamber of commerce; Dr. Edwin Lodge, Detroit, Michigan; George C. Jackson, member of council; J. D. Thomas, member of the board of health; Charles C. Benner, director of public safety; Wm. T. Sawyer, mayor; L. M. Latta, general manager of The Akron Water Works Company, and Edward W. Bemis, deputy commissioner of water supplies, New York City; and the matters as contained in the said complaint were discussed and argued by them in the presence of said Board, and

WHEREAS, After hearing and argument, the State Board of Health found and determined that the improvements or changes recommended in the report of its committee were necessary and should be made, but in view of a suit pending in the Supreme Court which might enable the city of Akron to secure a pure and suitable water supply without further action by the State Board of Health, further proceedings were suspended, and

WHEREAS, The decision of the Supreme Court being adverse to the city of Akron, at a meeting of the State Board of Health held in Cleveland, Ohio, June 29th, 1910, the question of the water supply of Akron being before the Board, said Board found and determined that the following improvements or changes in the condition aforesaid are necessary and should be made, to-wit: that The Akron Water Works Company be required, on or before January 1st, 1912, to install and place in operation a water purification plant which will meet the approval of the State Board of Health, or secure a new source of supply satisfactory to said Board.

THEREUPON, On motion duly seconded, the report and finding of said State Board of Health were, ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of the State of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

(Signed) C. O. PROBST,
*Secretary of State Board of Health
 of the State of Ohio.*

COLUMBUS, OHIO, October 3, 1910.

The foregoing report and findings having been examined by us, respectively, the Governor of the State of Ohio, and the Attorney General of the State of Ohio, the same are in all respects approved this 3d day of October, 1910.

(Signed) JUDSON HARMON,
Governor of Ohio.

(Signed) U. G. DENMAN,
Attorney General of Ohio.

REPORT ON AN INVESTIGATION OF THE ALLEGED POLLUTION OF JEROMEVILLE CREEK BY THE SEWAGE OF ASHLAND.

On March 31st, 1910, the following petition was received:

"To the Ohio State Board of Health.

I, the undersigned, clerk of the corporation of the village of Jeromeville, Ashland County, State of Ohio, do hereby certify that the council of said village, being in session on the 21st day of March, 1910, adopted a resolution of which the following is a true copy.

RESOLVED, That the village of Ashland, located in Ashland County, Ohio, is discharging and permitting to be discharged sewage and other wastes into Jeromeville Creek, and by reason thereof has so corrupted said creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Jeromeville, Ashland County, Ohio, who reside in the vicinity of said creek.

The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said village of Ashland, to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said board, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

(Signed) M. L. HOESLER,
Clerk, Jeromeville, Ohio."

Dated at Jeromeville, Ohio, this 21st day of March 1910.

Mr. Hartzell, member of the Board, and Mr. Hansen, acting chief engineer, were appointed a committee to investigate the conditions complained of. On May 27th, 1910, the committee visited Ashland and reported as follows:

Ashland is the county seat of Ashland County, has a population estimated at 8,000, and is located near the headwaters of Jeromeville Creek, a small tributary of the Muskingum drainage system. The village is well equipped with modern improvements. Since 1895 it has had a public water supply and since 1902 a sanitary sewerage system. At the time the sewerage system was installed it was appreciated that some form of purification must be adopted to prevent undue contamination of Jeromeville Creek. Local conditions indicated the best method to be intermittent filtration through beds prepared in the natural soil.

The plant as it now exists comprises three sedimentation tanks having a total capacity of about 39,000 gallons, and six filters varying in area from 0.54 acre to 1.04 acres and having a total area of about 5.00 acres. A very complete description of this plant will be found on page 444 of the 1908 special report. Suffice it to say at this point that the capacity of sedimentation tanks and the area and depth of filters are too small to permit of obtaining best results, yet the final effluent is non-putrescible and effectually does away with nuisance. The good results now being obtained must be in large part ascribed to the efficient care of the present health officer. There are marked visual evidences of contamination in the stream below the effluent outlet, but these extend for a distance of not over half a mile. Some indication of the results obtained are afforded by the accompanying analyses of samples obtained at the time of the investigation.

As regards the condition of the stream eight miles below at Jeromeville, whence the complaint emanated, there is no possibility whatever that it could be objectionably contaminated by the sewage of Ashland. Indeed in the light of other investigations of the engineering department of the State Board of Health on the effect of stream pollution, it is extremely doubtful if even analysis would detect pollution at Jeromeville were all of the sewage of Ashland discharged into the stream in an unpurified condition.

In explanation of the origin of this complaint, backed as it is by so little apparent evidence, it may be said that during the summer of 1909 Jeromeville was visited by an unusual number of cases of typhoid fever. The inception of this fever was attributed by one of the local physicians to infection contracted by several young men while bathing in the creek, and it was assumed that this infection had its origin in the sewage of Ashland. A more probable explanation of the cause of the typhoid fever is that it resulted from infected ice cream obtained from Mansfield, large quantities of which were consumed at a Fourth of July celebration. It will be recalled that a study of typhoid fever conditions in Mansfield during 1909 by the medical inspector of the Board revealed the very probable infection of ice cream in that city.

Whatever the primary cause of the fever, and this is somewhat enshrouded by lack of data, there cannot be any doubt that the continu-

ance of the disease throughout the summer was due to certain unsanitary conditions within Jeromeville itself. There are in the village many privy vaults of primitive construction, and these are often dangerously near shallow wells. A number of people have installed modern plumbing in their houses and are permitting sewage to discharge through field tile drains and out on to the surface of the ground in back alleys or other convenient places. Owing to the present small size of Jeromeville, these reprehensible practices have not yet resulted in gross nuisances, but with increased growth, which is apparently rapidly taking place, the conditions above referred to will not only more and more endanger health, but will prove very offensive to the senses as well.

It will be a long step toward bettering the healthfulness of Jeromeville if there were installed a system of substantially constructed sanitary sewers and purification works. This is rendered all the more necessary by the increasing practice of piping into houses water supplies obtained on hillsides back of the village.

While not so directly bearing on health considerations, some steps should also be taken to eliminate certain nuisances incident to keeping of swine and cattle within the thickly built up portion of the village.

EXAMINATION OF SEWAGE FROM ASHLAND.

PARTS PER MILLION.

Sample Number	Collected	Color	Turbidity	Sediment	Odor	Oxygen Required	Nitrogen as			
							Total Kjeldahl	Free Ammonia	Nitrites	Nitrates
982	1910 May 27		125	decided	septic sl. fresh	31.0	40.0	19.0	0	0
983	May 27		5	trace	sewage	11.2	19.1	7.5	0.040	1.4
984	May 27		0	0	0 sl. fresh	2.6	1.70	0.18	0.001	0.6
985	May 27		10	slight	sewage	8.4	11.9	5.0	0.015	1.0

Sample Number	Chlorine	Alkalinity	Incrustants	Sulphates	Residue of Evaporation		Dissolved Solids*	Bacteria.	
					Total	Loss on Ignition		Number per cc.	Colon Present
982	58.0	349	.....	.....	723	144	622	1,900,000	Positive 1-10,000 c.c.
983	69.0	312	.....	.....	606	33	606	450,000	Positive 1-1,000 c.c.
984	18.5	176	.....	.....	473	65	.....	7,200	Positive 1-10 c.c.
985	40.5	244	.....	.....	552	70	536	360,000	Positive 1-1,000 c.c.

No. No. No.

*Dissolved: Loss on Ignition 982 983 985

Source of samples: 75 46 56

No. 982 Crude sewage.

983 Effluent.

984 Creek above disposal plant.

985 Creek below disposal plant.

RECOMMENDATIONS.

In view of the foregoing, it is respectfully recommended that the authorities of Jeromeville be advised that there exists no cause for complaint on account of the pollution of Jeromeville Creek at Jeromeville due to the discharge into the creek of purified sewage from Ashland, but, on the other hand, there exists in Jeromeville itself certain unnecessary conditions as described above which should receive attention.

It is also recommended that a copy of this report be sent to the mayor and council of Jeromeville and to the mayor and council of Ashland.

This report was adopted by the State Board and a copy sent to the mayor and council of Jeromeville and of Ashland on July 9th, 1910.

REPORT OF AN INVESTIGATION OF THE PUBLIC WATER SUPPLY OF BELLAIRE.

On November 12th, 1909, the following petition was received from the board of health of Bellaire:

"To the Ohio State Board of Health.

I, the undersigned, clerk of the Board of Health of Bellaire, Belmont County, State of Ohio, do hereby certify that said board being in session on the 11th day of Nov., 1909, adopted a resolution of which the following is a true copy:

RESOLVED, That the public water supply of Bellaire, located in Belmont County, Ohio, is believed to be impure and dangerous to the health of the consumers of said supply.

The State Board of Health is hereby respectfully requested to investigate said public water supply of said city of Bellaire, Belmont County, Ohio, and to require said city of Bellaire to secure a new source of water supply, to install and place in operation, water purification works to purify said existing supply, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

(Signed) D. W. BOONE,
Clerk of Board of Health."

Dated at Bellaire, Ohio, this 11th day of November, 1909.

In accordance with the above petition, the acting chief engineer visited Bellaire on April 9th, 1910, and based on his investigation the following report was submitted:

Bellaire is a city with a population of about 12,000 and is located on the Ohio River in Belmont County. The water works at present in use were installed in 1872. From the first the water has been obtained directly from the Ohio River at a point north of the main business district of the city, but south of a large residential district and just below and near the outlet of Indian Run. The Ohio River at Bellaire is polluted to an unusual degree owing to the presence immediately above the city of the cities of Wheeling, West Virginia, and Martins Ferry and Bridgeport, Ohio. All of these cities discharge great quantities of sewage, manufacturing wastes, and other refuse into the stream, much of which must necessarily pass over the intake of the Bellaire water works. Not only is the water supply polluted by the cities of Wheeling, Martins Ferry, and Bridge-

port, but it is in addition polluted by its own sewage. There enter Indian Run but short distances above its confluence with the Ohio River, several city sewers which carry large quantities of domestic wastes. This sewage at times undoubtedly reaches the intake, though fortunately, during periods of low water, an obstruction in the bed of the stream causes the flow of Indian Run to pass out to mid-channel beyond the intake. The fact that the water supply is polluted is further demonstrated by a number of analyses made in the laboratories of the State Board of Health and herewith appended, and also by the fact that the typhoid fever death rate in Bellaire has uniformly been high, at times reaching epidemic proportions. About ninety percent of the inhabitants use the water for general purposes, and it is believed that fully eighty percent use it freely for drinking and in the preparation of food. In view of these figures, it is somewhat surprising that there is not an even greater prevalence of typhoid fever and other intestinal diseases than actually exists.

In August 1905, there were submitted to the State Board of Health plans for a mechanical filtration plant prepared by Mr. L. E. Chapin of Canton, consulting engineer. These plans were approved by the Board on September 7th, 1905, subject to the following conditions:

1st. That valves controlling the filtered water be so placed that they will not be submerged beneath the raw water.

2nd. That provision be made for wasting the flow of filtered water from any individual filter.

3rd. That devices for preventing a rate of filtration greater than 125,000,000 gallons per acre per day be installed at the filtered water outlet of each filter.

4th. That revised plans incorporating the above features and showing the plant as it will be actually built be submitted to the State Board of Health.

5th. That any changes in the management and operation of the plant or in the use of the coagulant be made when requested by the State Board of Health."

At a later date, revised plans were submitted, which complied satisfactorily with the first and second conditions of approval.

The plant was placed under construction and by April, 1908, had been practically completed, though it was impossible to place it in operation for the reason that there was still lacking certain apparatus for which the city government failed to appropriate money. It appears that the installation of the filter plant was not the result of any popular demand, but due to the desire on the part of certain city officials to provide purer and more wholesome water for the inhabitants. The money was raised by vote of council and not through a popular vote on a bond issue. The funds were therefore somewhat limited, and it was hoped to complete the work by additional funds raised by council in the year following the letting of the first contract. However, the new government, which was elected in the latter part of 1907 and took office in January 1908, was hostile to the filtration proposition and refused to make any further appropriations.

The city of Bellaire, therefore, is at present in the position of having a filtration plant costing to date approximately \$33,000, but which cannot be used owing to the failure of council to appropriate a matter of a few thousand dollars for the installation of certain accessories necessary to place the plant in operation. The recent inspection indicated the following to be necessary:

1. Repairs on coagulating basin.
2. Screening and replacing of sand and gravel.
3. Installation of air compressor and storage reservoir, or blowers.
4. Installation of filter rate controllers.
5. Installation of filter loss of head gages.
6. Completion of pipe connections for enabling high service pumps to draw from clear water reservoir.
7. Possible installation of additional boilers.
8. Laboratory equipment.

These various points will be briefly discussed in the order above given.

(1) The coagulating basin is a structure approximately 42 feet wide, 94 feet long, and 33 feet deep, having a capacity of 600,000 gallons which represents roughly $6\frac{2}{3}$ hours flow based on a nominal capacity for the plant of four million gallons. This basin is built close to the river's edge, and unfortunately the foundations were not carried to a sufficient depth to make them secure. The difficulty is somewhat increased by the use of rather thin wall sections, so that all things considered, the basin is quite unsafe. It was once filled with water which leaked out in the course of three days, and at the same time there developed dangerous cracks in the side walls, showing that the outer wall adjacent to the river was settling. The first steps necessary, therefore, to place the filtration plant in readiness for use is to reinforce the walls of the coagulating basin by suitable underpinning or otherwise, and make such other repairs as are necessary to insure reasonable watertightness.

(2) It was found that the filtering material in several of the filters was very improperly placed. Owing to some delay in the delivery of the gravel which was to form a portion of the underdrain system, the sand was put in place first and the gravel thrown on top. It was represented by the contractor who furnished the sand, that repeated washings of the filter would cause the gravel and sand to assume their proper places. Experience, however, with a large number of Ohio plants does not indicate that such an adjustment would take place. In fact, great difficulty has been found in keeping the gravel where it belongs even after most careful placing. It will, therefore, be necessary at some expense to remove all the filtering material, pass the same through screens in order to separate out the several sizes of gravel, and replace the material in the proper order.

(3) The filters were designed with a view to washing with both air and water. Since this plant was built, it has been amply demonstrated that with a sufficient volume of water, the filters may be successfully washed without air. In such case, however, a special design of the filters is necessary to prevent a large portion of the sand from passing off with the soiled wash water. The filters at Bellaire have not been so designed, and therefore, the air wash will be necessary. The piping for the air wash is already in place, but there is no means for furnishing the air under suitable pressure. To this end, there should be installed either an air compressor with suitable storage tanks, or a blower which will furnish air in sufficient quantity during washing.

(4) One of the original conditions of approval of this plant was that filter rate controllers be installed whereby the rate of filtration may be automatically maintained constant. However, such controllers were not included. It is understood from the consulting engineer that provision has been made for their installation in the clear water basin. Inasmuch as the clear water basin is likely to fill with water to above the level of the controllers, it will be necessary to use a submerged type of controller rather than a float and orifice controller. The design of the plant is unfortunately such that the placing of the controllers in the clear water basin will render them very inaccessible, which is an undesirable feature since devices of this character are liable from time to time to need repairs. However, the inaccessibility does not prevent their installation and successful operation, and for this reason they should be required.

(5) Another requirement of the original conditions of approval is that loss of head gages be installed. While these devices are not essential to the satisfactory operation of mechanical filters, yet they are exceedingly desirable, more especially in the smaller plants which do not as a rule receive the intelligent supervision of the larger ones. Loss of head gages should preferably be of the recording type. The advantage of loss of head gages is that they enable the filter operator to readily determine when the filters require cleaning, and give a valuable index at all times of the condition of the filters with respect to clogging.

(6) It goes without saying, that pump connections to the clear water basin are necessary. Fortunately, the piping for these connections is already on the ground and has only to be connected up.

(7) The boiler equipment at present consists of two 250 horse power water tube boilers. One of these boilers is capable of furnishing all the steam necessary for the plant as now operated. It is claimed by the superintendent of water works that if additional pumps are to be run for the purpose of raising water from the intake to the filter plant, it will become necessary to use both boilers at the same time, thus allowing no opportunity for cleaning or repairs. It is probable that if more efficient pumps were installed for the low lift from the river to

the filter plant, one boiler would still suffice. However, it may be found more economical for the present at any rate to install an additional boiler of say 100 or 150 horse power capacity.

(8) An essential to the proper operation of a mechanical filtration plant is a laboratory in which simple chemical and bacterial tests may be carried out, and to this end a suitable room should be prepared and equipped for laboratory use.

In order to have these various alterations and additions properly carried out, the city should be required to engage the services of a competent engineer experienced in the design and construction of water purification plants, with instructions to prepare the necessary plans and estimates of cost.

TABLE OF VITAL STATISTICS FOR BELLAIRE.

Year.	Population	Total Deaths	Total Deaths per 100,000	Typhoid Deaths	Typhoid Deaths per 100,000
1890	9,934	157	1,590	12	120
1891	9,932	159	1,600	7	70
1892	9,930	109	1,100	1	10
1893	9,928	136	1,370	3	30
1894	9,926	131	1,320	4	40
1895	9,924	131	1,320	10	100
1896	9,922	154	1,550	2	20
1897	9,920	116	1,170	6	60
1898	9,918	157	1,580	6	60
1899	9,915	146	1,470	8	80
1900	9,912	156	1,570	3	30
1901	10,121	174	1,720	3	30
1902	10,330	171	1,660	9	88
1903	10,539	155	1,470	5	48
1904	10,748	231	2,150	4	37
1905	10,957	179	1,630	2	18
1906	11,166	150	1,340	8	72
1907	11,375	214	1,880	4	35
1908	11,584	189	1,640	3	26
Average	10,315.7	158.7	1,534	5.3	51

EXAMINATION OF WATER FROM BELLAIRE.

PARTS PER MILLION.

Sample Number	Collected	Color	Turbidity	Sediment	Odor	Oxygen Required	Nitrogen as			
							Albuminoid Ammonia	Free Ammonia	Nitrites	Nitrates
	1886									
3	July	...	...	...	...	3.6	.15	.28	.08	3.56
1	July	...	...	...	...	8.6	.15	.11	.01	3.66
2	July	...	...	...	...	8.6	.18	.13	.01	3.75

Sample Number	Chlorine	Alkalinity	Incrustants	Sulphates	Residue on Evaporation		Iron	Bacteria.	
					Total	Loss on Ignition		Number per cc.	Colon Present
3	2.2	...	...	...	117	...	...	...	...
1	2.2	...	...	...	113	...	...	...	...
2	2.5	...	...	...	118	...	...	...	...

Source of Sample:

- No. 3 Power house, Bellaire water works.
 No. 1 Hydrant, B. & O. Depot.
 No. 2 Hydrant, 300 feet above the river.

EXAMINATION OF WATER FROM BELLAIRE.

PARTS PER MILLION.

Sample Number	Collected	Color	Turbidity	Sediment	Odor	Oxygen Required	Nitrogen as			
							Albuminoid Ammonia	Free Ammonia	Nitrites	Nitrates
1648	1901 Apr. 18	28	46	c	2 veg	2.57	.108	.064	.007	T
1718	June 24	22	6603	c	3 veg	5.64	.314	.040	.004	T
1773	July 17	40	73	c	3 veg	4.27	.262	.042	.005	.23
1814	Aug. 10	32	54	dec	3 veg	4.15	.180	.008	.002	.22
1861	Sept. 2	30	358	c	3 earthy	6.95	.216	.011	T	T
1879	Sept. 12	42	106	dec	2 veg	6.61	.245	.011	.000	.95
1904	Oct. 8	24	slight	s	3 veg	4.44	.154	.070	.001	.10
2007	Dec. 10	40	83	dec	3 veg	6.07	.278	.034	T	.94
Average		32	165			5.09	.220	.035	.002	.98

Sample Number	Chlorine	Alkalinity	Incrustants	Sulphates	Residue on Evaporation.		Suspended Solids	Bacteria.	
					Total	Loss on Ignition		Number per cc.	Colon Present
1648	8.2	25	42	.....	177	43	55	1,500	+
1718	18.8	35	.....	.....	378	91	204	5,200	++
1773	19.0	36	.....	.....	270	83	58	2,800	++
1814	32.0	44	.....	.....	250	71	u	1,400	—
1861	13.6	36	.....	.....	389	.....	208	9,600	—
1879	16.2	33	.....	.....	252	.....	73	4,100	—
1904	22.2	37	.....	.....	209	.....	u slight	1,100	—
2007	10.0	17	.....	.....	140	.....	28	10,500	++
Average..		35	.....	.....	258	.....	90	4,500	

Source of samples: Hydrant.

EXAMINATION OF WATER FROM BELLAIRE.

PARTS PER MILLION.

Sample Number	Collected	Color	Turbidity	Sediment	Odor	Oxygen Required	Nitrogen as			
							Albuminoid Ammonia	Free Ammonia	Nitrites	Nitrates
	1903									
2740	Apr. 13	60	225	consbl	earthy & veg.	7.54	.182	.152	.002	none
2796	June 1	50	87	consbl	2 earthy	6.74	.130	.040	none	none
2841	June 29	65	680	much	2 e & v	12.84	.450	.046	none	.8
2968	Aug. 11	42	20	slight	ft. veg.	3.86	.100	.036	none	trace
3071	Sept. 7	45	24	slight	e & v	7.25	.192	.070	trace	trace
3155	Oct. 8	30	dec	slight	none	2.84	.109	.038	.006	.3
3341	Dec. 7	30	10	slight	trace	5.44	.184	.142	trace	trace
Average		46	174			6.67	.192	.075	.001	.2

Sample Number	Chlorine	Alkalinity	Incrustants	Sulphates	Expiration. Residue on		Iron	Bacteria	
					Total	Suspended Solids		Number per cc.	Colon Present in 1 cc.
2740	1.6	64	39	.....	258	92	.....	3,000	yes
2796	9.8	24	.....	.....	163	26	.....	1,750	yes
2841	8.3	38	26	.....	639	509	.....	4,400	yes
2968	16.7	27	50	.....	181	trace	.....	850	yes
3071	8.7	39	32	.....	143	6	.....	650	yes
3155	27.9	37	76	.....	223	trace	.....	1,400	yes
3341	18.3	38	10	.....	161	trace	.....	7,900	yes
Average..	13.0	38	39	.....	253	.....	.....	2,850	

Samples represent public water supply of Bellaire.

CONCLUSIONS AND RECOMMENDATIONS.

The information at hand amply demonstrates that the public water supply of Bellaire is continuously subject to dangerous contamination, and that it is unfit without purification to be used for domestic purposes.

In view of this condition, it is respectfully recommended that the city of Bellaire be required to engage the services of a competent con-

sulting engineer with instructions to make such installations, repairs and changes as are necessary to place the water purification works in readiness for use on or before January 1st, 1911. Before any of the work is carried out, plans and specifications for same should be submitted to the State Board of Health for approval. When the plant is in readiness for operation, the city should be required to appoint, with the approval of the State Board of Health, a technically trained man as superintendent of filtration.

After giving the authorities of Bellaire an opportunity to be heard, the report of the Board's committee was adopted and the following order was issued to the mayor and council and the director of public service of Bellaire, December 6th, 1910:

AN ORDER OF THE STATE BOARD OF HEALTH TO THE CITY
OF BELLAIRE.

WHEREAS, The State Board of Health of the State of Ohio, having under consideration the conditions existing in the city of Bellaire, Belmont County, Ohio, as set forth in the complaint, in writing, made to said State Board of Health by the board of health of the city of Bellaire, as required by Section 2 of an act of the General Assembly of Ohio entitled, "An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution," passed April 7th, 1908, (O. L. 99 p. 74), did, in accordance with the duties imposed upon said Board by said act, pursue all and singular the requirements and duties to be performed by said State Board of Health, and,

WHEREAS, The State Board of Health, after investigating the conditions complained of, found that the public water supply of Bellaire is constantly subject to dangerous contamination and is unfit without purification for domestic purposes, and,

WHEREAS, Acting pursuant to the requirements of the act aforesaid, said State Board of Health thereupon on the 25th day of April, 1910, notified the director of public service of the city of Bellaire of its said findings, and gave said city an opportunity to be heard on the 29th day of June, 1910, and

WHEREAS, On the 29th day of June 1910, pursuant to said notice there appeared before the State Board of Health the following representatives from Bellaire: C. L. Belt, city solicitor; Charles Wassman, mayor; R. E. Crow, secretary of the board of control; Wm. A. Schram, director of public service; Dr. D. W. Boone, health officer and others and the matters as contained in the said complaint were discussed and argued by them in the presence of said board, and

THEREUPON, after such hearing and argument, the State Board of Health found and determined that the following improvements or changes in said conditions aforesaid were necessary and should be made; to-wit: That the city of Bellaire should make such installations, repairs and changes as are necessary to place the water purification works in readiness for use within a period of six months from the date of the approval of the Board's order by the Governor and the Attorney General, and that the city of Bellaire should engage the services of a competent consulting engineer, with instructions to prepare plans for such installations, repairs and changes, said plans to be approved by the State Board of Health.

THEREUPON, On motion duly seconded, the report and finding of said State

Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

C. O. PROBST,

*Secretary of State Board of Health of the
State of Ohio.*

September 24th, 1910.

COLUMBUS, OHIO, December 6th, 1910.

The foregoing report and findings having been examined by us, respectively, the Governor of the State of Ohio, and the Attorney General of the State of Ohio, the same are in all respects approved this 6th day of December, 1910.

JUDSON HARMON,

Governor of Ohio.

U. G. DENMAN,

Attorney General of Ohio.

REPORT ON INVESTIGATION OF A COMPLAINT OF A NUISANCE AT BRYAN.

On August 23rd, 1909, the following petition was received:

"To the Ohio State Board of Health.

I, the undersigned, clerk of the township of Pulaski in Williams County, State of Ohio, do hereby certify that the trustees of said township, being in session on the 21st day of August 1909, adopted a resolution of which the following is a true copy.

RESOLVED, That the village of Bryan, located in Williams County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into streams and ditches flowing through said Pulaski Township, and by reason thereof has so corrupted said streams and ditches as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Pulaski Township, Williams County, Ohio, who reside in the vicinity of said streams and ditches.

The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said village of Bryan, Ohio, to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said board, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

(Signed) JOHN P. FISHER,

Clerk Pulaski Township, Williams County,, Ohio."

Dated at Bryan, Ohio, this 21st day of August, 1909.

The president, on August 24th, appointed as a committee of the board to make the necessary investigation, Dr. Chapman, member, and the acting chief engineer. The committee visited Bryan on September

3rd, 1909, and in company with local officials made an inspection of the nuisance complained of. The following report was submitted:

The village of Bryan is located in the extreme northwestern part of the state and in the southern part of Williams County, of which it is the county seat. The population as estimated from census reports is in the neighborhood of 3200. The area within the corporation limits could not be ascertained. The general topography of the village and surrounding country is comparatively level. The drainage from the village is in general toward the east and southeast into two small streams known as Lynn and Joe runs and tributary ditches. These streams at best have but a small flow, and the ditches would be practically dry during the greater part of the year but for the wastes that enter them.

Bryan is primarily a farming center, though it has several important industries, among which may be mentioned The Van Camp Packing Company's condensed milk plant (to be spoken of later); the Bryan Show Case Company; the Cox Manufacturing Company (also manufacturers of show cases); the Bryan Manufacturing Company (manufacturers of wheelbarrows); and the Bryan Plow Company. In general the village presents a very neat and well kept appearance; the streets are wide and in many cases well paved, and there is an extensive system of well constructed sidewalks. There is also a municipal water works plant which furnishes an abundant supply of water of good quality from a sanitary point of view. The village, however, is lacking in what is essential to good sanitary conditions, namely, a properly constructed sewerage system.

The nuisance complained of by the trustees of Pulaski Township, from whom the petition emanated, is due to two causes; namely, the discharge of various public and private sewers and drains within the village of Bryan, and the discharge of wastes from the Van Camp Packing Company's condensed milk plant. These may be discussed in the order mentioned as follows:

Sewerage of the Village. The sewerage in general may be described as consisting of a number of poorly constructed drains originally intended for conveying storm water but which have subsequently been used to receive various domestic wastes and the discharge of water closets and cesspools. The total length of sewers in place could not be learned. Some of the sewers, more especially the tributary drains, are said to have been built by private parties and of these there is no record. The sewers, as already mentioned, discharge into Lynn Run and Joe Run, the latter being a tributary of the former. It is estimated that at the present time from 15 to 20 percent of the total population is tributary to the sewers. As the flow of these streams is very small, serious nuisance is created which has given rise from time to time to vigorous complaint.

Van Camp Packing Company's Condensed Milk Plant. When the Van Camp Packing Company's condensed milk plant was first placed in operation during the early part of the summer, the nuisance already existing was very much aggravated by the discharge into Joe Run of large quantities of water contaminated with washings from milk cans and the various tanks and apparatus used in the process of making condensed milk. These wastes are very large in volume, amounting to probably 200,000 gallons in twenty-four hours, and contain sufficient milk washings to render them highly putrescible. In composition, the wastes are similar to ordinary creamery wastes and yet are different in certain particulars which would have an influence on the design of a plant built for their treatment. While it was not possible during the preliminary inspection to gain adequate information as to the character of the wastes, it is believed that in a general way they should prove more amenable to treatment than the ordinary creamery wastes, since the problem would not be complicated by the presence of large numbers of acid forming bacteria, nor is it believed that the wastes are as strong as creamery wastes.

The investigation made by the committee indicates very conclusively that the discharge of sewage and wastes from the Van Camp Company's condensed milk plant into watercourses in the village of Bryan, creates an objectionable nuisances which may affect both the comfort and health of about thirty families living along the line of these watercourses in Pulaski Township.

The only way in which this nuisance can be abated is by the purification both of the sewage from the village of Bryan and the wastes from the condensed milk plant. In order that the sewage of Bryan may be purified, it will first be necessary to construct an adequate system of sewers whereby the sewage may be conducted to a suitable site for the location of purification works. The construction of such a system of sewers as well as the purification works would involve the expenditure of large sums of money, which expenditures can be met only by authorization on the part of the State Board of Health permitting the village to exceed the bonded debt limit now prescribed by the Longworth Act. The present assessed valuation of the village is \$1,042,640. The present bonded indebtedness is \$108,000, which is \$24,603 in excess of the limit fixed by the Longworth Act. Therefore, the entire 5 percent additional bonded indebtedness which may be authorized by the State Board of Health is not available, and the total amount of money which the village can raise by this means is but \$27,520.

RECOMMENDATIONS.

In view of the foregoing, the committee respectfully recommends the following:

1st. That the village of Bryan be required to engage the services of a competent consulting engineer well versed in sewerage and sewage disposal matters, for the purpose of preparing plans and estimates of a system of sewers and sewage purification works adequate for meeting the needs of the village and yet capable of being built within the present financial means of the municipality. It is assumed that this can be accomplished by a proper apportionment of the part of the work to be paid out of general village funds and the part to be paid for by special assessment of benefited property owners.

2nd. That the plans and estimates prepared in the manner above outlined be submitted to the State Board of Health not later than May 1st, 1910, to serve as a basis for further action by that body.

3rd. That the Van Camp Packing Company be required to purify the wastes from its condensed milk plant in a manner satisfactory to the State Board of Health, by October 1st, 1910.

4th. That the Van Camp Packing Company be informed that the State Board of Health is willing to assist the company to the extent of furnishing such general information in regard to the character of wastes, methods of treatment, etc., as will enable the company to properly design and construct a satisfactory purification plant.

The report and findings of the committee were adopted by the Board at a meeting held October 13th, 1909, and a copy of the report was sent to the Mayor and Council of Bryan, October 25th, 1909.

The Van Camp Packing Company was notified of the Board's findings and that the company would be required to install a plant for the purification of its sewage by October 1st, 1910. The Board's assistance, was offered in the way of furnishing such general information in regard to the character of wastes, methods of treatment, etc., as would enable the company to properly design and construct a satisfactory purification plant. The company was cited to appear before the Board to show cause why they should not comply with this requirement but failed to appear. It later developed that four hundred responsible citizens of Bryan had guaranteed this company an ample supply of water and suitable drainage, and it therefore devolved upon the village, or these responsible citizens, to furnish purification for the wastes from the company's plant as well as for the purification of the sewage of the village.

In May 1910 the village engaged the services of The Riggs and Sherman Company, consulting engineers of Toledo, and at their request an engineer of the Board made an investigation and report upon the Van Camp Packing Company's milk condensing plant in connection with the proposed sewerage and sewage purification plant for Bryan. The consulting engineers were advised that before designing the plant for the purification of the wastes from this plant a careful study should be made of the conditions under which the plant will operate.

(Plans for sewerage and sewage purification for Bryan were submitted by the consulting engineers and approved by the State Board of Health March 2nd, 1911.)

REPORT ON INVESTIGATION OF THE POLLUTION OF THE SANDUSKY RIVER BY THE SEWAGE OF BUCYRUS.

*On February 2nd, 1909, there was received from the county commissioners of Crawford County, the following:

"In the matter of the petition of Daniel Annmiller et al., relative to the deposit of sewage in the Sandusky River.

The above matter came in for hearing before the Board of County Commissioners of Crawford County, Ohio, in due session convened this 1st day of February A. D. 1909, and after the reading of the petition heretofore filed and after L. C. Reighner, attorney for the petitioners, stated the facts in the matter and the Board being fully advised and considering the provisions of an Act passed April 7th, 1908, entitled 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution' (99 O. L. 74), do find that the complaints made by said petitioners are properly founded and that the discharging of sewage into said stream is a public nuisance detrimental to health and comfort of the people of the community. And said Board does by this act make complaint in writing as provided in Sec. 1 of said act above referred. And the county auditor is hereby directed to cause a copy of this finding together with the petition filed with this board be sent to the State Board of Health.

(Signed) F. P. DICK,

(Signed) H. M. DOBBINS,

(Signed) J. H. PETRI,

Board of County Commissioners."

Attest: J. I. SMITH,

Auditor.

This petition to the State Board of Health was made at the instance of a complaint made in writing to the county commissioners of Crawford County by land owners residing in the vicinity of the Sandusky River within Crawford County and the city of Bucyrus.

A committee was appointed by the president of the Board February 4th, to investigate the conditions complained of. This committee, consisting of Dr. Chapman, member, and the chief engineer, visited Bucyrus on February 10th, 1909, met the mayor, city engineer, and other officials, and discussed the matter with them.

The following report was submitted:

Complaints regarding the pollution of the Sandusky River at Bucyrus have been made from time to time since 1895 or before. The pollution of the river at Bucyrus has been well known and acknowl-

edged for many years. In 1895 the secretary of the State Board of Health made a sanitary investigation of the conditions then complained of and recommended that an intercepting sewer be constructed to convey the sewage to a suitable site for purification works, and that the sewage there be purified. The report of the secretary made at that time states: "The river on account of such pollution was in an exceedingly filthy condition, worse at some places than others. * * * The water was inky black, and the odor was foul and nauseating."

In 1897 proposed plans for additional sewerage for Bucyrus were disapproved by the State Board of Health on account of the already badly polluted condition of the stream.

In 1898 a general inspection of the sewerage of Bucyrus was made by the engineer of the Board in connection with an examination of the watershed of the Sandusky River. The report made at this time showed that the conditions existing three years previous, in 1895, had not been improved.

In 1905 the city solicitor requested the State Board of Health to investigate the sanitary conditions and sewerage with reference to the necessity for sewage purification. This action was prompted by various suits which had been filed against the city by farmers living below. An investigation and report was made by the chief engineer, which is published in the annual report of the State Board of Health for 1905. Owing to the cold weather at the time of this inspection, no great nuisance was being created, yet there were abundant evidences of objectionable pollution. The report in addition to discussing such pollution, points out the danger to the water supplies of Upper Sandusky, Tiffin, and Fremont, caused by the sewage from Bucyrus. The following are the conclusions of the report, a copy of which was sent to the city solicitor on January 21st, 1905.

"Sewage purification works, for the disposal of the city's sewage, should be constructed as soon as possible.

It is especially important, on account of the use of the Sandusky River below Bucyrus as a source of water supply, that these works be designed and operated in such a manner that the sewage will be purified as thoroughly as possible.

A competent engineer, well informed and experienced in matters pertaining to sewerage and sewage disposal, should be retained at once to make preliminary surveys, estimates and investigations.

This engineer should determine:

1st. The cost of building an interceptor to receive the dry weather flow only, of the present sewers, together with the cost of pumping this dry weather flow to the proper site for purification works and the cost of such works.

2nd. The cost of a new sanitary system of small pipe sewers for domestic sewage only, to discharge by gravity at purification works, together with the cost of these works. In this case the present combined sewers would be used for storm water only.

3rd. The cost of a new sanitary system of small pipe sewers to discharge at purification works by pumping, together with the cost of pumping and purifi-

cation works. In this case the present combined sewers would be used for storm water only.

4th. The best method of disposing of the various manufacturing wastes and the possible harm to the efficiency of the sewage purification works if mixed with the city sewage.

5th. The flow of all present main sewers together with the chemical composition of the sewage."

In April, 1908, plans for sewage in District No. 6 and for a sewer in Plymouth Street were submitted to the State Board of Health for approval. After investigation these plans were disapproved on account of the existing pollution of the stream and the necessity for improved sewerage. The report made by the engineering department relative to the above proposed sewerage, contains the following statement:

"Existing Sewerage. Practically the whole of the built-up portion of the city is accessible to sewers, but probably less than half the population is tributary for sanitary purposes. The introduction of modern plumbing has been rather slow, and outdoor privies are still used in even the thickly built up portions of the city. The sewers are used primarily for sink and cellar drainage. The exact proportion of the whole population tributary in this manner could not be ascertained but is probably in the neighborhood of eighty per cent. The sewers have fourteen outlets along the waterfront, which discharge into the river at various points. Most of the outlets are small and have but little effect on the appearance of the stream. About three-fourths of the area of the built up portion of this city is tributary to what is known as the 'main sewer,' which discharges very large quantities of apparently strong sewage at a point below where the built up portion recedes from the river banks. Thus foul odors in the vicinity of the outlet do not give rise to local complaints."

There are probably at the present time about 800 closet and vault connections which are used by nearly half the population. The total length of sewers is eight or nine miles.

At the conference between the chief engineer and the local officials, on February 10th, 1909, previous reports of investigations were discussed, and the city engineer stated that the conditions as described in these reports represented those which exist today. It is plainly evident, therefore, and generally acknowledged that the Sandusky River is being badly polluted by the sewage from Bucyrus to the discomfort and danger of riparian owners below the city as well as to the danger of the water supplies of Upper Sandusky, Tiffin, and Fremont.

The city auditor of Bucyrus had furnished the following statement in regard to the financial condition of the city at the present time:

(1) Total tax duplicate, 1908.....	\$3,435,480
(2) Total bonded indebtedness exclusive of special as-	
sessments	77,100

(3) Total bonded indebtedness for special assessments....	21,000
(4) Amount of indebtedness incurred previous to passage of Longworth Act	32,500
(5) Unfunded debt (certificate of indebtedness)	1,600

Street improvements contemplated and authorized by council for the year 1909, about \$30,000.

From the above, it will be noted that the total bonded indebtedness, exclusive of special assessments, is \$77,100, or only 2.2 per cent of the total tax duplicate. It will be seen, therefore, that the city is well within the debt limit. Information obtained from the city solicitor further points to the fact that it is generally acknowledged that the city is in good financial condition.

SUMMARY.

The sewage from the city of Bucyrus is being discharged in an unpurified state into the Sandusky River and by reason thereof has so corrupted said river that there are created conditions detrimental to the health and comfort of persons living along the stream below the city; and furthermore, such discharge of sewage endangers the water supplies of the cities of Upper Sandusky, Tiffin and Fremont.

After giving the authorities a hearing, the Board adopted the report of its committee, and the following order was sent to the mayor and council and the director of public service of Bucyrus, December 6th, 1910:

AN ORDER OF THE STATE BOARD OF HEALTH TO THE CITY OF BUCYRUS.

WHEREAS, The State Board of Health of Ohio, having under consideration the conditions existing in and about the city of Bucyrus, Crawford County, Ohio, as regards the pollution of the Sandusky River as set forth in the complaint, in writing, made to said State Board of Health through the commissioners of Crawford County by land owners residing in the vicinity of the Sandusky River within Crawford County, as required by Section 1 of an act of the General Assembly of Ohio entitled "An Act to authorize the State Board of Health to require the purification of sewage and water supplies and to protect streams against pollution," passed April 7th, 1908 (O. L. 99 p. 74), did, in accordance with the duties imposed upon said Board by said act, pursue all and singular the requirements and duties to be performed by said State Board of Health, and

WHEREAS, The State Board of Health, after investigating the conditions complained of, found that the sewage and other wastes flowing from the city of Bucyrus into the Sandusky River have so corrupted the same as to give rise to foul and noxious odors thereby creating conditions that are detrimental to the health and comfort of persons living along the said stream below said city; and

WHEREAS, On the 14th day of April, 1909, the city solicitor of the city of Bucyrus, Mr. O. W. Kennedy, notified the State Board of Health that it had been unanimously agreed by the officials of the city of Bucyrus that the city should

enter its appearance by and through its proper officials at the meeting of the said Board in April, and

WHEREAS, On the 21st day of April, 1909, pursuant to the notice received, there appeared before the State Board of Health, Mr. O. W. Kennedy, city solicitor and Mr. F. L. Neiderheiser, city engineer, representing the city of Bucyrus and the matters as contained in said complaint were discussed and argued by them in the presence of said Board, and

THEREUPON, After such discussion and due consideration of said complaint the State Board of Health found and determined that the following changes in said conditions aforesaid are necessary and should be made, to-wit: That the city of Bucyrus should be required to purify its sewage in a manner satisfactory to the State Board of Health on or before October 1st, 1911.

THEREUPON, On motion duly seconded, the report and findings of the said Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by said Board of Health of the State of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

C. O. PROBST,

*Secretary of the State Board of Health
of the State of Ohio.*

October 10th, 1910.

COLUMBUS, OHIO, December 6th, 1910.

The foregoing report and findings having been examined by us, respectively, the Governor of the State of Ohio, and the Attorney General of the State of Ohio, the same are in all respects approved this 6th day of December, 1910.

JUDSON HARMON,

Governor of Ohio.

U. G. DENMAN,

Attorney General of Ohio.

REPORT ON NUISANCE IN COUNTY DITCH PASSING
THROUGH JACKSON TOWNSHIP, DARKE COUNTY,
CAUSED BY THE DISCHARGE OF LIQUID WASTES
FROM THE RENOVATED BUTTER AND CHEESE
FACTORY OF THE J. A. LONG PRODUCE
COMPANY OF UNION CITY, OHIO.

On July 14th, 1909, there was received from Mr. Charles F. Shepherd, clerk of Jackson Township, Darke County, the following petition:

"To the Ohio State Board of Health:

I, the undersigned, clerk of Jackson Township, Darke County, State of Ohio, do hereby certify that the trustees of said township, being in session on the 13th day of July, 1909, adopted a resolution of which the following is a true copy.

Resolved, That the plant of J. A. Long & Co., located in Darke County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into Corporation, Pierce and Gray Branch ditches, and by reason thereof has so cor-

rupted said ditches as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Jackson Township, Darke County, Ohio, who reside in the vicinity of said ditches.

The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said plant of J. A. Long & Co., to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said board, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

(Signed) CHARLES F. SHEPHERD,

Dated at Union City, Indiana,
this 13th day of July, 1909

*Clerk Jackson Township,
Darke County, Ohio.*

At the time the above petition was received the engineering department of the State Board of Health was conducting a series of experiments on the purification of creamery wastes at Sunbury, Ohio, and it was believed advisable before making an investigation to wait until these experiments were completed. Accordingly, under date of July 16th, 1909, a communication was sent to Dr. J. E. Detamore, health officer Jackson Township, requesting a postponement of the action called for in the petition. Notwithstanding this request the township health officer sent to the State Board of Health a communication under date of July 17th, 1909, urging immediate investigation.

On July 26th, 1909, Mr. A. E. Kimberly, then assistant engineer, visited Union City and made a thorough inspection of the ditch in which the nuisance was being created, and also visited the plant of the Long Produce Company and gained some knowledge of the processes there conducted. The results of this investigation were embodied in a report under date of August 13th, 1909, the substance of which is contained in the following quotations:

"The condition of the ditches in Jackson Township, into which discharges the storm water sewage from the village of Union City, Ohio, is very foul and substantially as set forth in the petition under the Bense Act. Present evidence is conclusive in showing that this condition is almost entirely attributable to the discharge of organic wastes from the plant of the Long Produce Company, which is engaged in the manufacture of renovated butter and cheese. The wastes from this plant are discharged into the system of storm water sewers of Union City, Ohio.

"Since the plant was constructed, it appears that there has been a nuisance at the point of discharge of the sewers and in the ditches into which the sewage flows. The matter was taken into the courts about three years ago and finally is stated to have reached the Supreme Court of Ohio, and in each case the company lost. The court ordered the company to install such devices for the treatment of its wastes as should be deemed wise by the Circuit Court. These devices ordered by the court comprise a settling tank from which the clarified sewage is discharged as formerly into the Union City sewers. The clarified sewage is distinctly putrescent and this treatment is by no means sufficient to prevent a nuisance.

"No data are available as to the volume and character of these wastes and these features should receive further study; also the question of a site for a

purification plant. With this information at hand and in the light of the knowledge of treatment of the wastes of the dairy industry, it is believed that suggestions can be made that will enable these wastes to be sufficiently purified to abate the present existing nuisance."

On August 30th, 1909, the acting chief engineer submitted a report, based on the facts stated in the previous report, recommending that the Long Produce Company be required to purify the wastes from its butter renovating and cheese factory in a location and in a manner satisfactory to the State Board of Health; and in event this proved to be not feasible, that the company be compelled to conduct their waste producing operations in a new locality where the discharge of the wastes will not produce a nuisance, or where a suitable purification plant may be constructed. It was also recommended that the Long Produce Company be advised that the State Board of Health is willing to co-operate in the further study of the problem and to furnish information on the basis of which the purification works may be designed. The recommendations made in this report were not formally acted upon, as it was deemed advisable to give the Long Produce Company further time to develop some feasible solution of the difficulty.

Through correspondence, the Long Produce Company was advised that a plant suitable for the treatment of its wastes must be located at least 500 feet from the nearest dwellings, that if a gravity flow of wastes through the plant was to be secured, there must be available a difference of elevation between the outfall of the sewer and the effluent drain of the purification plant of at least six feet. It was also pointed out that if such a difference of elevation was not available, pumping must be resorted to. The company was then requested to secure the services of a surveyor for the purpose of determining whether or not a site fulfilling the above conditions was available.

Owing to the apparent inaction on the part of the Long Produce Company, and a repeated remonstrance on the part of the complainants, it was deemed necessary on October 18th, 1909, to send another letter to the Long Produce Company urging some definite action. The requirements of a suitable site for the purification works were again pointed out, and the company was urged to make an investigation and definitely advise the State Board of Health not later than November 15th, 1909, whether or not such site was available. It was also stated that if purification works could not be installed, there remained nothing for the State Board of Health to do but to require the Long Produce Company to cease altogether the waste producing operations in its present establishment. Under date of October 21st, 1909, a reply was received to this communication stating that there was a site to be had about 300 feet from the nearest residence and about 600 feet from the second nearest residence, and that the site comprised a low piece of ground but that it could not be reached at a sufficient elevation for puri-

fication works without pumping. In addition a request for a conference was made in order that the company's side of the case might be effectually presented. On November 3rd, 1909, Mr. J. A. Long appeared at the Secretary's office and stated that the nuisance was due quite as much to the sewage from Union City, Ohio, as to wastes from his establishment, and that he wished to take up, with the assistance of the State Board of Health, a project for collecting and purifying in a common system the sewage from Union City and the wastes from the Long Produce Company's plant.

On December 27th, 1909, a letter was received from the company stating that the newly elected officials of Union City, Ohio, were ready to take up the proposition of building a system of sewers and a sewage purification plant conjointly with the Long Produce Company. Accordingly, on January 11th, 1910, the acting chief engineer visited Union City and conferred with Mr. Pearl Turner, the new mayor, and Mr. William Hodupp, local manager of the Long Produce Company. At this conference it was stated by the Board's representative that the project was a feasible one but that the proportionate cost thereof, which should be assessed respectively upon the village and the produce company, could only be determined after careful engineering investigation involving the consideration of the relative character of wastes from the Long Produce Company's plant and the sewage from the village. The mayor was informed that as soon as more favorable weather conditions occurred, a representative of the engineering department of the State Board of Health would make a series of visits to Union City for the purpose of obtaining information relative to the source and quality of the various wastes and in order to secure samples for analysis. On March 7th, 1910, two representatives of the engineering department visited Union City and initiated the work above outlined. The results of this visit showed that the statement made by Mr. J. A. Long, namely, that the nuisance created was due quite as much to sewage from the village as to wastes from the company's plant was in error, for the reason that there are practically no sanitary wastes being discharged into the sewers of Union City, Ohio. It is true that a few cesspool overflows are tapped into the sewers, but wastes from these are small in amount and would not cause any perceptible nuisance in the ditch into which the sewers discharge. On the other hand, the wastes from the company's plant are large in quantity, high in organic matter, and very offensive when in a putrefying condition. This visit was unsatisfactory in as much it was found impossible to obtain at the time representative samples of the liquids discharged from the plant of the produce company, or any reliable figures as to their quantity. Furthermore, it was apparent that owing to the irregular manner in which the plant is operated, and the great number of processes carried on, that the collection of representative samples and the measurement of the quantities

of wastes produced would be exceedingly difficult and would require the constant presence of a technically trained man for a period of a month or more.

The meager information at hand made it plain that the village would have little to gain by joining with the company in constructing sewerage and sewage purification works; nor was it apparent that the company would profit much by the proposed arrangement, assuming that it paid its fair share of the cost of construction.

In view of the foregoing, the acting chief engineer recommended:

1st. That the Long Produce Company be required by July 1st, 1911, to have in operation a purification plant for treating all of the liquid wastes produced by its establishment at Union City, Ohio, in a manner satisfactory to the State Board of Health;

2nd. That before construction was begun on the plant, detailed plans be submitted to and receive the approval of the State Board of Health;

3rd. That the Long Produce Company be advised that the State Board of Health was willing to assist the company to the extent of conducting a study of the amount and character of its wastes, with a view of making recommendations for the design of the purification works. (Such study necessitating the employment on the part of the company, for a period of a month or more, of a competent technical assistant to be selected by the State Board of Health.)

4th. That failing to comply with the above, the company be required to conduct its wastes producing operations in a new location where these wastes could be disposed of without offensiveness, either by dilution in a large water-course or by satisfactory means of purification.

At a meeting held April 20th, 1910, the State Board of Health considered the complaint, adopted the report of its acting chief engineer, and found that a nuisance was created, detrimental to the comfort of the people of Jackson Township, Darke County, living in the vicinity of Corporation, Pierce and Gray Branch ditches. It was voted to give the company an opportunity to be heard before the Board at its meeting to be held June 29th, to show cause, if any, why the Board should not issue an order requiring the company to take proper measures to abate the nuisance complained of by purifying the waste substances from its plant, or otherwise, not later than January 1st, 1911, or remove the plant to some other location where the business might be conducted without public offense.

June 28th, 1911, the J. A. Long Company telegraphed that the company would make no more butter until an outlet was secured into the Indiana side of the city.

REPORT ON INVESTIGATION OF THE POLLUTION OF THE
PUBLIC WATER SUPPLY OF LIMA.

On May 5th, 1910, the following petition relative to the pollution of the public water supply of Lima was received:

"To the Ohio State Board of Health.

I, the undersigned, clerk of the board of health of the city of Lima, Allen County, State of Ohio, do hereby certify that the board of health of said city, being in session on the 4th day of May 1910, adopted a resolution of which the following is a true copy.

Resolved, That the county infirmary, located in Allen County, Ohio, is discharging sewage and other wastes into Lima reservoir and by reason thereof has so corrupted the water of said reservoir as to be a menace to the public water supply of the city of Lima, Allen County, Ohio.

The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said parties responsible to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said board, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution', passed April 7th, 1908.

Board of Health

Clerk (Signed) H. J. LAWLER,
Lima, Ohio."

Dated at Lima, Ohio, this 4th day of May, 1910.

The president of the Board appointed Dr. Warner, member, and Mr. Hansen, acting chief engineer, a committee of investigation. On May 26th, 1910, the acting chief engineer visited Lima and made an inspection on the ground.

The following report was submitted.

The city of Lima, which has a population of about 35,000 derives its water supply from the Ottawa River. The supply is pumped intermittently into a large reservoir having a capacity of about 600,000,000 gallons, representing with the present rate of consumption a storage of about six months' supply. The purpose of using this large reservoir is to enable those in charge of the water works to draw water from the river only at high stages after the stream and its tributaries have been flushed out, and owing to the rapid run-off the water is comparatively soft. This reservoir was built in 1904 without being submitted to the State Board of Health for approval, notwithstanding the fact that a letter from the Secretary of the Board called the attention of the local authorities to the necessity of securing the Board's approval in order to conform to the law. (For complete description of the reservoir together with other features of the water works, see Report on the Public Water Supply of Lima, Annual Report, 1907.)

The work on the reservoir was crudely done and the plans were not

strictly adhered to. Among certain changes made in the original plans was the matter of the diversion of a small stream receiving sewage from the Allen County Infirmary. Originally this stream passed through the present site of the reservoir. The plans called for conducting it through a suitable conduit to the down-stream side of the reservoir and at least half a mile below the water works intake. After construction was under way, it was evident that much money could be saved the contractor by conducting the ditch through a conduit in the opposite direction and permitting it to discharge into the Ottawa River immediately below the point of intake. This change of plans was acceded to by the city's engineer in charge of the work. It will be noted that only a comparatively few feet separate the intake channel of the reservoir from the ditch carrying the infirmary sewage. When the river is in flood the strip of land separating the intake channel from the infirmary ditch is completely covered by water and the eddy currents may readily carry pollution from the ditch into the intake. This is all the more significant when it is recalled that the reservoir is filled only during high stages of the river.

Inasmuch as the city of Lima was originally responsible for cutting off from the county infirmary means for disposing of its sewage, and inasmuch as the city proceeded with the work without the sanction of the State Board of Health and even undertook to change plans manifestly to the disadvantage of sanitary conditions merely from a desire to save expense for the contractor, it would seem a matter of justice to require the city of Lima rather than the county commissioners of Allen County to so divert the drainage from the county infirmary as to preclude any possibility of the contamination of the water supply at the intake.

RECOMMENDATIONS.

In view of the foregoing, your committee respectfully recommends that the city of Lima be required to provide necessary sewers, channels, or other means that will successfully convey all objectionable drainage now entering the ditch passing the county infirmary and entering the Ottawa River near the water works intake, to a point well below the reservoir where it will not endanger the public water supply of Lima.

This report was adopted by the State Board of Health and the Lima authorities were given an opportunity to be heard, after which the following order was issued to the mayor and council and the director of public service of Lima, December 6th, 1910:

AN ORDER TO THE CITY OF LIMA, OHIO.

WHEREAS, The State Board of Health of Ohio having under consideration the conditions existing in the city of Lima, Allen County, Ohio, as regards the pollution of the public water supply as set forth in the complaint, in writing, made to said State Board of Health by the board of health of the city of Lima, and as

required by Section 1 of an act of the General Assembly of Ohio entitled "An Act to authorize the State Board of Health to require the purification of sewage and public water supplies and to protect streams against pollution," passed April 7th, 1908, (O. L. 99 p. 74), did, in accordance with the duties imposed upon said Board by said act, pursue all and singular the requirements and duties to be performed by said State Board of Health, and

WHEREAS, The State Board of Health after investigating the conditions complained of, found that the public water supply of Lima is endangered by objectionable drainage in the Ottawa River near the water works intake; and further found that the reservoir for said water supply was built without the approval of the State Board of Health, and that the original plans were changed whereby a small stream receiving the sewage from the Allen County Infirmary was diverted so as to discharge into Ottawa River immediately below the water intake with the result that when the river is in flood eddy currents may readily carry pollution from the ditch to the intake, and

WHEREAS, Acting pursuant to the requirements of the act aforesaid, said State Board of Health thereupon on the 9th day of July, 1910, notified the mayor and council and the director of public service of the city of Lima of its said findings, and gave said officials an opportunity to be heard before said Board on the 27th day of July, 1910, and

WHEREAS, On the 27th day of July, 1910, pursuant to said notice there appeared before the State Board of Health the following representatives from Lima: Mr. W. J. McLaughlin, city solicitor, and Mr. A. L. Methcany, city engineer, and the matters as contained in the said complaint were discussed and argued by them in the presence of said Board, and

THEREUPON, after such hearing and argument, the State Board of Health found and determined that the following improvements or changes in said conditions aforesaid were necessary and should be made, to-wit: That the city of Lima provide on or before January 1st, 1911, necessary sewers, channels, or other means that will successfully convey all objectionable drainage now entering the ditch passing the Allen County Infirmary and entering the Ottawa River near the water works intake, to a point well below the reservoir where it will not endanger the public water supply of the city of Lima.

THEREUPON, on motion duly seconded, the report and findings of said State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

September 24th, 1910.

C. O. PROEST,
*Secretary of State Board of Health
of the State of Ohio.*

COLUMBUS, OHIO, December 6th, 1910.

The foregoing report and findings having been examined by us, respectively, the Governor of the State of Ohio, and the Attorney General of Ohio, the same are in all respects approved this 6th day of December, 1910.

JUDSON HARMON,
Governor of Ohio.
U. G. DENMAN,
Attorney General of Ohio.

REPORT OF AN INVESTIGATION OF THE PUBLIC WATER SUPPLY OF LIMA.

On December 2nd, 1910, there was received from Mr. H. J. Lawler, clerk of the board of health of Lima, the following petitions:

"To the Ohio State Board of Health:

I, the undersigned, clerk of the board of health of the city of Lima, Allen County, State of Ohio, do hereby certify that said board being in session on the 26th day of November, 1910, adopted a resolution of which the following is a true copy.

Resolved, That the public water supply of the city of Lima, located in Allen County, Ohio, is believed to be impure and dangerous to the health of the consumers of said supply.

The State Board of Health is hereby respectfully requested to investigate said public water supply of said City of Lima, Allen County, Ohio, and to require the removal of all sources of pollution affecting said supply; or if this be impractical, to require said city of Lima to secure a new source of water supply, or to install and place in operation, water purification works to purify said existing supply, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

H. J. LAWLER,

Clerk of Board of Health.

Dated at Lima, Ohio this 30th day of November, 1910."

A committee consisting of Mr. John W. Hill, member, and the chief engineer had visited Lima November 18th, met the city officials and the source of public water supply was thoroughly discussed.

The quality of Lima's water supply had been the subject of study by the engineering department of the Board for some months and the following report was made:

On March 8th and 26th, 1910, one of the assistant engineers visited Lima and arranged for the collection of a series of samples to represent the quality of the supply obtained from the Lima Lake reservoir. This report is based on information obtained during these visits and on the analytical results from samples collected during the period from March 8th to June 22nd, 1910.

On August 18th, 1906, the assistant engineer of the State Board of Health made an examination of the public water supply of Lima. In his report on this examination, the following points were noted as a summary.

"1. The project for constructing the Ottawa River storage reservoir was not submitted to the State Board of Health for approval.

2. The Lost Creek supply, which has several times been condemned by the State Board of Health owing to the difficulty of keeping a close watch upon the condition of the watershed, is still continued in use.

3. The Ottawa River storage reservoir, as built, is of crude design, and is very poorly constructed.

4. There is a possible danger that waters from the Allen County Infirmary may be washed into the intake channel to the Ottawa River storage reservoir, during the high stages of the river, and a further investigation at the proper time should be made to determine whether or not the danger actually exists.

5. Analyses of the water in the Ottawa River storage reservoir, made by the State Board of Health, show the presence of decomposing organic matter, though there is very little to show that this is dangerous in character; nor is it possible on account of the limited number of the analyses, to ascertain the purifying effect of long storage.

6. Owing to the persistent turbidity of the water pumped at high stages of the river and the possibility of its being contaminated by sewage from Ada as well as other points on the watershed that cannot be frequently inspected, filtration of the supply would seem to be highly desirable if not necessary. Further investigations should be made with this in view.

7. In connection with any filtration project, it would be well to inquire into the cost of softening the water of the Ottawa River."

It was in order to pursue an extended investigation of the supply, according to the foregoing suggestions, that the recent examinations were made.

Present Source of Supply. During the past few years, the Lima Lake reservoir supplied by water from the Ottawa River has furnished practically the entire supply of the city. At certain times during the year, a small amount of water is obtained from deep wells located near the Lost Creek reservoir. This is done only during extremely dry seasons. The Lost Creek supply has not been used in recent years. The old valve connecting the Lost Creek reservoir to the main conduit at the time of the recent examination was in a leaky condition and permitted some seepage into the supply. The condition of the Lost Creek reservoir is at all times unsatisfactory, the surface being covered with a scum of oil and driftwood. The city has been recently ordered, under the Bense Act, to protect the supply from pollution from the Allen County Infirmary.

The total capacity of the Lima Lake reservoir is approximately 600,000,000 gallons. The reservoir is, however, maintained at all times considerably below its maximum capacity on account of the weakness of the embankments with which it is surrounded. The level in the reservoir is maintained by intermittent pumping into it from the Ottawa River, which passes along its southerly embankment. The amount of water pumped into the reservoir during each period is variable, depending upon the availability of satisfactory water in the river. Pumping is done during the subsidence of the stream following a freshet, and it rarely occurs that water is pumped from the river when it is at low stage. As representative of the quantity of water usually pumped into the reservoir during a period, the following records are given:

From March 18th, 12:00 noon to March 23rd, 10:30 a. m., 1910,

60,000,000 gallons; from May 11th to May 13th, 1910, 45,000,000 gallons.

These figures are representative for ordinary seasons of the year but are exceeded greatly during the fall when the reservoir is at low stage, owing to the dry summer season. It is then necessary to extend the pumping periods to cover a week or more.

Schedule of Sampling. Owing to the fact that wide fluctuations occur in the quality of the Ottawa River water even during a period of pumping, it is obviously necessary to secure a series of samples during each period to represent with any degree of accuracy the quality of the water introduced into the reservoir. In collecting samples it was therefore arranged that one sample be taken each day during which water was being pumped from the river. The samples were taken from a point in the intake channel near the river and about one foot below the surface. In order to determine the quality of the water after passing through the reservoir, a schedule of sampling of this water was also arranged. Immediately previous to and following a period of pumping, samples were collected from the conduit line leading from Lima Lake to the storage reservoir at the pumping station. The point of collection of these samples was selected in a concrete manhole where the conduit from Lima Lake enters the old conduit from Lost Creek reservoir. A slight leakage from the Lost Creek reservoir enters the manhole, but the point of sampling was placed above any possibility of contamination.

All samples collected for this examination were taken by Mr. S. A. Lytle, superintendent of water works.

Quality of Ottawa River Water. During seven periods of pumping from March 18th to June 22nd, 1910, a total of twenty-six samples was taken to represent the quality of the water pumped into the Lima Lake reservoir from the Ottawa River. The physical characteristics of the water represented by the analyses of these samples did not fluctuate greatly. The maximum turbidity recorded was 95, indicating that the stream was at no time at flood stage. The water usually contained a slight sediment and an odor of a vegetative character. The mineral constituents were subject to a very wide and irregular fluctuation. This is due largely to variations in the flow of the river, but the wide fluctuations in the river indicate that oil well wastes coming from wells near the stream have an influence on the character of the water. These wastes also affect the other mineral constituents. From a sanitary standpoint the Ottawa River water shows the presence of sewage pollution and is entirely unsuitable as a public supply. This pollution is evidenced by the high nitrogen content as well as by the bacterial content. The colon bacillus was found present in one or 10 c. c. portions of 60 percent of the samples, while 40 percent gave negative results for 10 c. c. portions.

Quality of Water from Lima Lake Reservoir. From March 8th to June 22nd, 1910, covering the seven periods of pumping, a total of ten samples was collected to represent the quality of the water from the Lima Lake reservoir. In general these samples show fluctuations as great as those taken from the Ottawa River. The physical characteristics of this water are not much better than those of the Ottawa River. The maximum turbidity was 52 and the average of all the analyses was about the same as that of the river water. At all times there was a slight sediment and a vegetative odor present. The mineral constituents do not indicate the wide fluctuations as is the case with the river water, and this is probably due to the mixing brought about by currents in the reservoir. From a sanitary standpoint the analyses indicate no improvement in the water by storage in the reservoir. No noticeable reduction in the nitrogen content is apparent and the bacterial results are fully as objectionable as those for the river water. In the ten samples from the Lima Lake reservoir, the colon bacillus was positive in 10 c. c. portions in 57 percent of the samples, 43 percent resulting in negative determinations.

EXAMINATION OF WATER FROM LIMA.

EXISTING PUBLIC WATER SUPPLY.

PARTS PER MILLION.

Sample Number	Collected	Color	Turbidity	Sediment	Odor	Oxygen Required	Nitrogen as			
							Albuminoid Ammonia	Free Ammonia	Nitrites	Nitrates
1910										
9367	Mar. 18	13	15	slight	sl. oily	4.8	.134	.002	.002	3.0
9368	Mar. 19	15	15	slight	sl. oily	4.75	.174	.046	.002	2.4
9369	Mar. 20	12	10	trace	none	4.85	.178	.024	.003	3.0
9378	Mar. 20	20	25	trace	veg.	5.75	.172	.012	.003	2.2
9379	Mar. 21	15	20	trace	veg.	4.50	.134	.014	.003	2.0
9380	Mar. 22	20	25	trace	veg.	5.65	.162	.014	.003	2.2
9411	Apr. 19	5	5	trace	sl. oily	4.50	.156	.028	trace	none
9412	Apr. 20	12	45	trace	veg.	6.80	.228	.042	trace	1.0
9414	Apr. 21	15	95	distinct	musty	6.40	.380	.056	.001	5.4
9415	Apr. 22	10	34	slight	veg.	5.55	.310	.094	.003	3.0
9416	Apr. 23	8	27	slight	veg.	4.85	.290	.062	.002	2.4

Sample Number	Chlorine	Alkalinity	Incrustants	Sulphates	Residue on Evaporation		Iron	Bacteria	
					Total	Loss on Ignition		Number per cc.	Colon Present
9367	68.0	156	155	....	587	124	0.7	720	Neg. in 10 cc.
9368	49.5	110	100	....	423	96	0.5	.....	.....
9369	89.5	157	160	....	643	121	0.6	.....	.....
9378	63.5	142	172.5	....	587	100	0.5	.....	.....
9379	36.	154	150	....	511	85	0.5	.....	.....
9380	64.5	142	177.5	....	581	93	0.5	.....	.....
9411	112.	180	207.5	....	740	130	0.5	1,300	Pos. in 10 cc.
9412	49.	90	90	....	375	60	1.5	7,200	Pos. in 10 cc.
9414	37.5	72	80	....	381	96	2.5	8,400	Pos. in 1 cc.
9415	40.	94	95	....	375	83	1.2	23,000	Pos. in 10 cc.
9416	45.	100	102.5	....	391	90	1.0	20,000	Pos. in 1 cc.

Source of Samples.

All the above samples were taken from the intake channel leading from the Ottawa River to the pumps supplying the Lima Lake reservoir. These samples were taken from a depth of about one foot below the surface. Samples Nos. 9367 to 9380 were taken during a period of pumping from March 18 to March 22, 1910. Samples Nos. 9411 to 9416 were taken during a period of pumping from April 19th to April 23rd, 1910.

EXAMINATION OF WATER FROM LIMA.
EXISTING PUBLIC WATER SUPPLY.

PARTS PER MILLION.

Sample Number	Collected	Color	Turbidity	Sediment	Odor	Oxygen Required	Nitrogen as			
							Albuminoid Ammonia	Free Ammonia	Nitrites	Nitrates
	1910									
9417	Apr. 24	5	10	trace	veg.	3.85	.224	.046	.002	0.8
9420	Apr. 25	10	20	slight	none	5.10	.226	.044	.004	6.0
9421	Apr. 28	22	20	slight	none	4.79	.222	.046	.002	4.0
9422	Apr. 29	17	5	trace	ft. veg.	4.0	.226	.034	trace	.08
9440	May 11	17	30	slight	tr. veg.	4.30	.270	.055	.002	1.0
9445	May 12	13	5	trace	sl. veg.	3.55	.224	.100	.001	1.4
9462	May 19	15	15	trace	veg.	4.10	.194	.056	.002	0.8
9464	May 20	15	15	trace	sl. veg.	4.35	.244	.076	.002	0.8
9466	May 21	15	10	slight	veg.	4.10	.162	.134	.003	0.6

Sample Number	Chlorine	Alkalinity	Incrustants	Sulphates	Residue on Evaporation.			Bacteria.	
					Total	Loss on Ignition	Iron	Number per cc.	Colon Present
9417	57	91	95	....	365	88	0.5	29,000	Neg. in 10 cc.
9420	26	132	125	....	444	87	1.0	3,500	Pos. in .1 cc.
9421	18	128	105	....	400	68	1.3	4,800	Pos. in 10 cc.
9422	55	88	90	....	361	55	0.3	18,000	Neg. in 10 cc.
9440	47.5	95	87.5	....	348	27	1.0	1,400	Pos. in 10 cc.
9445	28	150	132.5	....	450	86	0.7	132	Neg. in 10 cc.
9462	65	166	155	....	622	142	0.4	144	Pos. in 10 cc.
9464	53.5	165	137.5	....	574	119	0.7	4,800	Neg. in 10 cc.
9466	125	162	175	....	673	140	0.5	1,100	Pos. in 10 cc.

Source of Samples.

All of the above samples were taken from the intake channel leading from the Ottawa River to the pumps supplying the Lima Lake reservoir. The samples were taken from a depth of about one foot below the surface. Samples Nos. 9417 to 9422 were taken during a period of pumping from April 24th to April 29th, 1910. Samples Nos. 9440 and 9445 were taken during a period of pumping from May 11th to May 12th, 1910. Samples Nos. 9462 to 9466 were taken during a period of pumping from May 10th to May 21st, 1910.

EXAMINATION OF WATER FROM LIMA.

EXISTING PUBLIC WATER SUPPLY.

PARTS PER MILLION.

Sample Number	Collected			Sediment	Odor	Oxygen Required	Nitrogen as			
		Color	Turbidity				Albuminoid Ammonia	Free Ammonia	Nitrites	Nitrates
1910										
9504	June 12	17	15	trace	veg.	3.95	.284	.132	.002	0.6
9506	June 13	16	10	trace	sl. veg.	3.95	.246	.096	.003	0.8
9511	June 16	17	5	slight	veg.	4.09	.252	.066	trace	1.4
9512	June 16	17	5	slight	veg.	3.50	.250	.136	.003	1.0
9519	June 22	16	3	trace	none	3.65	.268	.046	.008	1.8
9521	June 22	15	15	slight	sl. sweet- ish	3.75	.330	.112	.006	1.0
*Average		14.3	19.2			4.58	.228	.060	.002	1.9

Sample Number	Chlorine	Alkalinity	Incrustants	Sulphates	Residue on Evaporation.			Bacteria.	
					Total	Loss on Ignition	Iron	Number per cc.	Colon Present
9504	67	139	132.5	....	539	57	0.7	2,500	Pos. in 10 cc.
9506	75	130	130	....	526	37	0.6	2,900	Neg. in 10 cc.
9511	41.5	112	95	....	393	78	0.8	3,000	Neg. in 10 cc.
9512	48.5	124	115	....	438	85	0.5	.....	.....
9519	42.5	112	90	....	405	76	0.5	3,000	Pos. in 1 cc.
9521	41.5	110	92.5	....	425	90	1.2	2,400	Neg. in 10 cc.
*Aver...	55.6	127	124.9	....	483	89	0.8	6,865	Pos. in 1 or 10 cc. 60%. Neg. in 10 cc. 40%.

Sources of Samples.

All of the above samples were taken from the intake channel leading from the Ottawa River to the pumps supplying the Lima Lake reservoir. The samples were taken from a depth of about one foot below the surface. Samples Nos. 9504 to 9512 were taken during a period of pumping from June 12th to June 16th, 1910. Samples Nos. 9519 and 9521 were taken during a period of pumping on June 22nd, 1910.

*Average of 26 analyses.

EXAMINATION OF WATER FROM LIMA.

EXISTING PUBLIC WATER SUPPLY.

PARTS PER MILLION.

Sample Number	Collected	Color	Turbidity	Sediment	Odor	Oxygen Required	Nitrogen as			
							Albuminoid Ammonia	Free Ammonia	Nitrites	Nitrates
	1910									
9362	Mar. 8	10	37	distinct	veg.	5.5	.002	.078	.004	1.4
9381	Mar. 23									
9383	Mar. 28	20	25	slight	veg.	4.65	.286	.098	.002	1.2
9410	Apr. 19	10	8	trace	earthy	4.60	.244	.016	trace	0.8
9423	Apr. 29	15	15	slight	str. veg.	3.55	.252	.016	trace	1.0
9441	May 11	19	52	slight	str. veg.	3.75	.164	.051	.001	1.4
9463	May 19	13	15	trace	str. veg.	4.70	.340	.296	.003	1.4
9467	May 24	16		slight	str. veg.	4.15	.208	.126	.006	1.0
9505	June 13	18	10	trace	str. veg.	4.25	.294	.052	.003	1.2
9520	June 22	15	10	trace	str. veg.	3.95	.254	.022	.003	1.0
*Average		15	21.5			4.34	.227	.074	.002	1.16

Sample Number	Chlorine	Alkalinity	Incrustants	Sulphates	Residue on Evaporation.			Bacteria.	
					Total	Loss on Ignition	Iron	Number per cc.	Colon Present
9362	50.5	92	40	....	337	67	1.3	2600	Pos. in 10 cc.
9381								3600	Neg. in 10 cc.
9383	44.	86	80	....	323	71	0.5	.....	.....
9416	61.	94	116	....	389	72	0.5	.....	.....
9423	53.	92	90	....	365	71	0.6	.....	.....
9441	69.	149	137.5	....	538	42	1.5	3000	Pos. in 10 cc.
9463	45.	101	90	....	378	95	1.0	42000	Neg. in 10 cc.
9467	44.	98	107.5	....	363	75	1.0	2200	Pos. in 10 cc.
9505	40.5	107	87.5	....	371	69	0.5	1200	Neg. in 10 cc.
9520	41.0	106	85.0	....	369	82	0.6	3600	Pos. in 1 cc.
Aver...	50.1	102.8	91.9	....	381.4	71.6	0.83	8315	Pos. in 10 cc. 57%. Neg. in 10 cc. 43%.

Source of Samples.

All of the above samples were taken from the conduit leading from the Lima Lake reservoir to the storage reservoirs at the pumping station. The sam-

ples were taken from a manhole on the line at the point where the conduits from the Lima Lake reservoir and the Lost Creek reservoir join.

Samples Nos. 9362 and 9381 taken previous to pumping March 18th, 22nd, 1910.

Sample 9383 taken subsequent to pumping March 18th, 22nd, 1910.

Sample 9410 taken previous to pumping April 19th, 23rd, 1910.

Sample 9423 taken subsequent to pumping April 19th, 23rd, 1910.

Sample 9441 taken previous to pumping May 11th, 12th, 1910.

Sample 9463 taken previous to pumping May 19th, 21st, 1910.

Sample 9467 taken subsequent to pumping May 19th, 21st, 1910.

Sample 9505 taken previous to pumping June 12th, 16th, 1910.

Sample 9520 taken subsequent to pumping June 22nd, 1910.

SUMMARY.

From the results obtained by the analysis of this extended series of samples collected from March 8th to June 22nd, 1910, to represent the effect of long storage upon the Ottawa River water, it appears that practically no improvement in the water is effected. A separation of the suspended solids consisting of the finely divided clay and sediment takes place, but no improvement in the determinations for turbidity is apparent. It is quite likely that growths of organisms tend to prevent a reduction of turbidity. Considering the sanitary features, the water drawn from the Lima Lake reservoir and used for a public supply is of practically the same quality as that taken from the Ottawa River. It appears, therefore, that the Lima Lake reservoir accomplishes little or nothing in improving the river water.

After giving the authorities an opportunity to be heard the State Board of Health adopted this report and the following order was sent to the mayor and council and the director of public service of Lima, February 25th, 1911:

This order was issued in 1911 but is made a part of the report for convenience of record.—ED.

ORDER OF THE STATE BOARD OF HEALTH TO THE CITY OF LIMA.

WHEREAS, The State Board of Health of the State of Ohio having under consideration the conditions in the city of Lima, Allen County, Ohio, as set forth in the complaint, in writing, made to the said State Board of Health by the board of health of the city of Lima, Allen County, Ohio, as required by Section 2 of an Act of the General Assembly of Ohio, entitled, "An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution," passed April 7th, 1908 (99 O. L., p. 74), did, in accordance with the duties imposed upon said Board by said act, pursue all and singular the requirements and duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint, and

WHEREAS, The State Board of Health, after investigating the conditions complained of, found that the public water supply of Lima is impure and dangerous to health and that it is not possible to sufficiently eliminate the sources of pollution now affecting it, and

WHEREAS, Acting pursuant to the requirements of the act aforesaid, said State Board of Health thereupon on the 12th day of December, 1910, notified the director of public service and the mayor and council of the city of Lima of its said findings, and gave said city an opportunity to be heard on the 25th day of January, 1911, and

WHEREAS, On the 25th day of January, 1911, pursuant to said notice, there appeared before the State Board of Health Mr. George Dyer, mayor; Mr. J. W. Rowlands, director of public service; Mr. W. J. McLaughlin, city solicitor; Mr. T. A. Collins and Mr. L. E. Justus, councilmen; Mr. H. J. Lawler, city clerk, and Mr. A. L. Metheany, city engineer, representing said city, and the matters as contained in said complaint were then discussed and argued by them in the presence of said Board, and

THEREUPON, After such hearing and argument, the State Board of Health found and determined that the following improvements or changes in said conditions aforesaid were necessary and should be made; to-wit: That the city of Lima should be required to construct and place in operation a water purification plant satisfactory to the State Board of Health by November 1st, 1911.

THEREUPON, On motion duly seconded, the report and findings of said State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.
February 10th, 1911.

(Signed) C. O. PROBST,

Secretary of State Board of Health of the State of Ohio.

COLUMBUS, OHIO, February 24th, 1911.

The foregoing report and findings having been examined by us, respectively, the Governor of the State of Ohio, and the Attorney General of the State of Ohio, the same are in all respects approved this 24th day of February, 1911.

(Signed) JUDSON HARMON,

Governor of Ohio.

(Signed) TIMOTHY S. HOGAN,

Attorney General of Ohio.

REPORT ON AN INVESTIGATION OF THE CONTAMINATION OF THE WATER SUPPLY OF THE CITY OF COLUMBUS BY SEWAGE FROM THE VILLAGE OF MARBLE CLIFF.

On April 7th, 1910, there was received from Mr. John W. Keegan, clerk of the board of health of Columbus, the following petition:

"To the Ohio State Board of Health:

I, the undersigned clerk of the board of health of the city of Columbus, Franklin County, State of Ohio, do hereby certify that the board of health of said city, being in session on the 5th day of April, 1910, adopted a resolution of which the following is a true copy:

Resolved, That the village of Marble Cliff, located in Franklin County, Ohio, is discharging and permitting to be discharged, sewage and other wastes.

into Scioto River, and by reason thereof has so corrupted said Scioto River as to cause conditions that are a menace to the public water supply of the city of Columbus.

The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said village of Marble Cliff to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said Board, in accordance with 'An act to authorize the State Board of Health to require the purification of sewage and public water supplies and to protect streams against pollution', passed April 7th, 1908.

(Signed) JOHN W. KEEGAN,
Clerk of Board of Health, Columbus, Ohio."

Dated at Columbus, Ohio,
this 9th day of April, 1910.

The president of the Board appointed Dr. Frank Warner, member, and Mr. Paul Hansen, acting chief engineer, a committee to make the investigation requested in the above petition. On April 14th, 1910, the committee visited Marble Cliff, made an inspection, and submitted the following report:

Marble Cliff is a small residential village having a population of about 150, and is located in a westerly direction from the city of Columbus on the north bank of the Scioto River. The corporation covers an area of about 120 acres and the built up portion is situated on high ground overlooking the Scioto valley.

At present there is no system of sewers and the sewage from the various residences is carried by means of private drains into gulleys and cesspools or is permitted to seep away into the ground. Much of the sewage finds its way directly or indirectly into the Scioto River at a comparatively short distance above the Columbus water works intake. Two of these private drains in particular are of special menace to the Columbus water supply. One of them receives the sewage from the Country Club and several residences and discharges into an open gully. During dry weather this sewage seeps away into the ground before reaching the river, but whenever there is a natural flow in the gully the sewage is carried directly to the river. The other of these drains receives the sewage from several large residences and is discharged on to the surface of the ground in a field. This sewage also seeps away into the ground and by means of open channels in the underlying limestone finds an almost direct passage to the river, where it issues in the form of a spring. A number of analyses of the water from this spring made in the laboratories of the State Board of Health indicate the same to be nothing more than clarified sewage which still retains a large percentage of the organic matter and intestinal bacteria originally present.

With the more or less rapid building up of the village, the quantity of sewage reaching the river is increasing from year to year and it is apparent even from casual observation that some other means of sewage

disposal should be found in order to avoid placing an undue burden upon the Columbus water purification plant.

In the early part of 1909, agitation was instituted in Marble Cliff for an adequate system of sanitary sewers, including sewage purification works for final disposal. An engineer was employed and plans for the improvement were prepared and submitted to the State Board of Health for approval. On April 23rd, 1909, the following letter of approval was sent to the mayor and council:

"To the Mayor and Council, Marble Cliff, O.

DEAR SIRS:—The State Board of Health at a meeting held April 21, 1909, approved plans for proposed sewerage and sewerage purification for the village of Marble Cliff, Franklin County, as shown on drawings and as described in specifications submitted April 14, 1909, by Messrs. Bradbury and Shute of Columbus, consulting engineers, provided:

1st. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being placed.

2nd. That detailed drawings of all automatic apparatus be submitted to and receive the approval of the State Board of Health before the same is installed.

3rd. That the sewage purification works be completed before any of the proposed new sewers are placed in use, and that a competent person, satisfactory to the State Board of Health, be employed and held responsible by the village for the proper operation of the purification works.

4th. That this approval be void after May 1, 1910, unless construction of the works is commenced before that date.

Yours very truly,

(Signed) C. O. PROBST,

Secretary."

By order of the Board.

Owing to objections on the part of certain property owners, these plans have not been carried out. The board of health of the city of Columbus, however, feels that the city is entitled to some protection of its water supply on the part of the state against sewage contamination from Marble Cliff, and accordingly submitted the petition in compliance with which this investigation was made.

RECOMMENDATION.

In view of the foregoing, the committee concludes that the sewage now reaching the Scioto River is a menace to the quality of the public water supply of Columbus, and recommends that the village of Marble Cliff be required to have completed and in operation on or before January 1st, 1911, a system of sanitary sewers and sewage purification works whereby all the sewage from the village may be collected and purified in a satisfactory manner. The village authorities should be advised that plans for sewerage and sewage purification already approved by the State Board of Health April 23rd, 1909, will meet all the requirements of the Board if properly constructed and maintained.

At the April meeting of the State Board of Health this report was adopted, and the authorities of Marble Cliff were cited to appear before the Board at its June meeting. They waived this right and stated that they would proceed at once to construct sewerage and a sewage disposal plant in accordance with the plans approved.

January 25th, 1911, samples of filtering material were approved by the Board for use in this disposal plant.

REPORT ON INVESTIGATION OF THE POLLUTION OF MILL CREEK BY THE SEWAGE AT MARYSVILLE.

On July 18th, 1910, there was received from Mr. W. F. Brodrick, clerk of Paris Township, Union County, the following petition:

"To the Ohio State Board of Health:

I, the undersigned, clerk of Paris Township, Union County, State of Ohio, do hereby certify that the trustees of said township, being in session on the 14th day of July, 1910, adopted a resolution of which the following is a true copy:

Resolved, That the village of Marysville, located in Union County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into Mill Creek, and by reason thereof has so corrupted said Mill Creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Paris Township, Union County, Ohio, who reside in the vicinity of said creek.

The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said village of Marysville, to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said board, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

(Signed) W. F. BRODRICK,
Clerk Paris Township, Union County, Ohio.

R. C. LANTZ,
A. C. EDSON,
W. M. LONGBRAKE,

Dated at Marysville, Ohio,
this 16th day of July, 1910.

C. W. HOOPES, *Health Officer.*"

The president of the Board appointed the following committee to investigate the matter and report thereon: Dr. Warner and the chief engineer. The members of this committee visited Marysville on July 23rd, 1910, and August 3rd, 1910, respectively, and investigated the conditions complained of.

The following report was submitted:

The pollution of Mill Creek by the sewage of Marysville and also the pollution of Town Run, which passes through said village, is a matter of which the State Board of Health has been cognizant for some years. On October 22nd, 1908, there was received from the board of health of the city of Columbus, a petition under the Bense Act requesting that the village of Marysville be restrained from contaminating the waters of Mill Creek and hence the water supply of Columbus. With reference to this petition, an extended investigation was made in which Mill Creek and the Scioto River were inspected and sampled at some six places between Marysville and the Columbus water supply. While the results of analysis of samples showed a considerable amount of self-purification of the original polluting material before the intake of the Columbus water works was reached, nevertheless the analyses as well as the inspection showed that Mill Creek was badly polluted for several miles below Marysville in Paris Township, and the conditions in the fall of 1908 were found to be detrimental to the health and comfort of the residents of said township.

The recommendations of the committee appointed to investigate the complaint received in 1908, which committee consisted of Dr. Warner, the secretary, and the chief engineer, were that from the standpoint of the creation of gross pollution in Town Run at Marysville and Mill Creek below Marysville, and also from the standpoint of the pollution of the Columbus water supply, there should be installed at Marysville a system of sewers and sewage purification works capable of purifying the sewage to a high degree.

Following a hearing given the local officials, the State Board of Health adopted the resolution quoted below, which is the last action taken by the Board in the matter.

"WHEREAS, The village of Marysville, through its officials and representatives, at a public hearing held at the office of the State Board of Health on January 20th, 1909, did promise and agree to take all measures in their power to secure the introduction of a system of sewers with sewage purification works in the near future for the village of Marysville. Therefore,

BE IT RESOLVED, That the State Board of Health does hereby grant to the said village of Marysville two years from this date in which to install a system of sewers and sewage purification works satisfactory to this Board."

The inspections of the members of the committee appointed to investigate the recent complaint show that conditions have not improved but have probably grown worse during the last two years; and that the village should receive a definite order to cease polluting Mill Creek before July 1st, 1911, and to have plans and specifications for the necessary works made and submitted to the State Board of Health at its meeting to be held October 19th, 1910.

After giving the authorities an opportunity to be heard, the following order was sent to the mayor and council of Marysville February 25th, 1911:

(The following order of the State Board of Health, approved by the Governor and the Attorney General, was issued in 1911 but is made a part of this report in order to complete the record. — Ed.)

AN ORDER OF THE STATE BOARD OF HEALTH TO THE VILLAGE OF MARYSVILLE.

WHEREAS, The State Board of Health of the State of Ohio, having under consideration the conditions existing in and adjacent to the village of Marysville, Union County, Ohio, as set forth in a complaint, in writing, made to said State Board of Health by the trustees of Paris Township, Union County, Ohio, as required by Section 1 of an Act of the General Assembly of Ohio, entitled, "An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution," passed April 7th, 1908 (99 O. L., p. 74), did, in accordance with the duties imposed upon said Board by said act, pursue all and singular the requirements and duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint, and

WHEREAS, The State Board of Health, after investigating the conditions complained of, found that the said village of Marysville, Union County, Ohio, is discharging and permitting to be discharged sewage and other wastes into Mill Creek at and below the village of Marysville, and by reason thereof has so corrupted said creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the comfort of the citizens of Paris Township, Union County, who reside in the vicinity of said creek, and

WHEREAS, Acting pursuant to the requirements of the act aforesaid, said State Board of Health on the 27th day of October, 1910, notified such village so causing the contamination or pollution of such creek, of its said findings, and on the 25th day of November, 1910, notified said village that it would be given an opportunity to be heard before said Board on the 25th day of January, 1911, and

WHEREAS, On the 25th day of January, 1911, pursuant to said notice, there appeared at the office of the State Board of Health prior to said meeting Dr. C. E. Hoopes, member of council of the village of Marysville, who stated that council had authorized the employment of an engineer to prepare plans for a sewage disposal plant for the village but that such engineer had not yet been selected.

THEREUPON, After discussion and due consideration of said complaint, the State Board of Health found and determined that the following improvements or changes in said conditions aforesaid were necessary and should be made, to-wit: That the village of Marysville be required to install and have in operation sewerage and sewage purification works, satisfactory to the State Board of Health, on or before November 1st, 1911.

THEREUPON, On motion duly seconded, the report and findings of said State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of the State of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.
February 10th, 1911.

C. O. PROBST,

Secretary of the State Board of Health of the State of Ohio.

COLUMBUS, OHIO, February 24th, 1911.

The foregoing report and findings having been examined by us, respectively the Governor of Ohio and the Attorney General of the State of Ohio, the same are in all respects approved this 24th day of February, 1911.

JUDSON HARMON,

Governor of Ohio.

TIMOTHY HOGAN,

Attorney General of Ohio.

REPORT ON INVESTIGATION OF THE POLLUTION OF FIRST CULBERT CREEK BY THE SEWAGE OF SALEM.

On September 29th, 1910, there was received from Mr. Jas. A. Probert, clerk of the city council of Salem, Ohio, the following petition:

"To the Ohio State Board of Health:

1, the undersigned, clerk of the council of the city of Salem, Columbiana County, State of Ohio, do hereby certify that the council of said city, being in session on the 20th day of September, 1910, adopted a resolution of which the following is a true copy.

Resolved, That the city of Salem, located in Columbiana County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into First Culbert Creek, and by reason thereof has so corrupted said creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Salem, Columbiana County, Ohio, who reside in the vicinity of the point of discharge of said sewage.

The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said city of Salem, to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said Board, in accordance with "An Act to authorize the State Board of Health to require the purification of sewage and public water supplies and to protect streams against pollution" passed April, 7th, 1908.

Salem City Council,

Clerk JAS. A. PROBERT,

Salem, Ohio.'

Dated at Salem, Ohio,
this 21st day of September, 1910.

On September 30th, 1910, the president of the State Board of Health appointed as a committee to investigate the alleged pollution, Mr. Hartzell, member, and the chief engineer. This committee visited Salem on October 27th, conferred with the local officials and inspected the conditions complained of, and submitted the following report:

Previous to 1906 there had been constructed in the city of Salem about 9 miles of sewers, principally on the combined plan and discharging at several different outlets; the outlets for the greater portion of the sewers being located near the Pennsylvania Railroad Station where the sewage is discharged into a county ditch with a result that objectionable

conditions are created. The other outlets also are the cause of much complaint.

On October 17th, 1906, plans for a sewage purification plant, also showing proposed changes and additions to the sewer system, were approved by the State Board of Health under the following conditions:

"1st. That the plant be enlarged, in a manner satisfactory to the State Board of Health, when deemed necessary by said Board;

2nd. That the dosing pond be reduced so that it will hold about 50,000 gallons;

3rd. That the automatic apparatus be replaced by a single siphon discharging, by means of gates, on to any filter desired;

4th. That the entire area of filters as shown on the plans be constructed as the first installation; and,

5th. That the method of operation of the plant be at all times satisfactory to the State Board of Health."

At the present time the total mileage of sewers has been increased to about 13 miles, which includes two miles of 24-inch intercepting sewer which terminates on a 30-acre tract of land, owned by the city, bordering the north side of the Pennsylvania Railroad and about one mile west of the city's corporation line. This tract of land has been purchased as a site for sewage purification works. Although the intercepting sewer has been constructed, all the sewage of the city is not discharged into it, the old outlet into the county ditch south of the railroad station still being used.

The discharge from the outlet of the new interceptor was estimated, on the day of inspection, to be about 500,000 gallons per day. This sewage was being discharged through a short ditch into First Culbert Creek. First Culbert Creek is a tributary of Beaver Creek, which ultimately passes through Leetonia and Lisbon on its way to the Ohio River. The condition of the stream below the outlet, on the day of inspection, although considerable rain had fallen on the day previous, was very foul and was a distinct offense to the senses of those living in the neighborhood or owning land through which the stream passes. By reason of the discharge of the city's sewage, a natural watercourse has been rendered utterly useless for stock watering or other purposes. A number of law suits have been started against the city by owners of land below the outlet.

As will be seen from the above discussion, the outlet of this sewer has been built within the last two or three years in violation of the law which forbids the establishment of new sewer outlets without the approval of the State Board of Health. Of course the city authorities do not entirely ignore the matter of purifying the sewage, as evidenced by the purchase of the site and the preparation of plans.

Nevertheless, the new outlet has been established and placed in use to the distinct detriment of persons living in the vicinity, without mak-

ing any practical provision for installing a purification plant. In fact, it is now claimed that the city is not financially able to spend any money for sewage purification unless it is enabled to increase its bonded indebtedness through the medium of an order from the State Board of Health under the Bense law. It was stated by the mayor that the city of Salem had practically reached the limit of its permissible bonded indebtedness. It was believed, however, that if the State Board of Health should order the city to install a purification plant, the additional five percent of the assessed valuation, which could be raised on the authority of such an order would permit the plant to be built. It will be noted that the petition under the Bense Act is made by the city itself through its city council and not by the persons who live below the outlet and who are most damaged. This would seem to indicate that the city desires to build the plant.

RECOMMENDATIONS.

In view of the fact that your committee has found, after investigation, that the sewage from the city of Salem has in its opinion so corrupted the stream known as First Culbert Creek as to give rise to conditions detrimental to the health and comfort of those residing or owning property in the vicinity of the stream, or below the point of discharge, it is recommended that the State Board of Health adopt the report of this committee and notify the officials of the city of Salem of such action, and give said officials of Salem an opportunity to be heard and show cause why the city of Salem should not be required to purify its sewage on or before November 1, 1911.

After giving the authorities an opportunity to be heard, which they waived, the report of the Board's committee was adopted and the following order was sent to the mayor and council and the director of public service of Salem, February 25th, 1911:

(The following order of the State Board of Health, approved by the Governor and the Attorney General, was issued in 1911 but is made a part of this report in order to complete the record. — Ed.)

AN ORDER OF THE STATE BOARD OF HEALTH TO THE CITY OF SALEM.

WHEREAS, The State Board of Health of the State of Ohio, having under consideration the conditions existing in and adjacent to the city of Salem, Columbiana County, Ohio, as set forth in the complaint, in writing, made to said State Board of Health by the council of the city of Salem, Columbiana County, Ohio, as required by Section 1 of an Act of the General Assembly of Ohio, entitled, "An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution", passed April 7th, 1908, (99 O. L., p. 74), did, in accordance with the duties imposed upon said Board by said act, pursue all and singular the requirements and

duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint, and

WHEREAS, The State Board of Health after investigating the conditions complained of, found that the city of Salem, Columbiana County, Ohio, is discharging and permitting to be discharged sewage into First Culbert Creek, and by reason thereof has so corrupted said creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the comfort of the citizens of Columbiana County who reside in or own property in the vicinity of said creek, or below the point of discharge; and

WHEREAS, Acting pursuant to the requirements of the act aforesaid, said State Board of Health thereupon on the 7th day of December 1910, notified such city so causing the contamination or pollution of such creek, of its said findings, and gave said city an opportunity to be heard on the 25th day of January 1911: and

WHEREAS, On the 25th day of January 1911, no representative from said city of Salem having appeared, a letter was presented from the clerk of council, acknowledging receipt of said notice and stating that the city solicitor had advised that council could not appropriate money to send such representative.

THEREUPON, After discussion and due consideration of said complaint, the State Board of Health found and determined that the improvements or changes in said conditions aforesaid are necessary and should be made, to-wit: That the city of Salem be required to purify its sewage in a manner satisfactory to the State Board of Health on or before November 1st, 1911.

THEREUPON, On motion duly seconded, the report and findings of said State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

February 10th, 1911.

(Signed) C. O. PROBST,

Secretary of the State Board of Health of the State of Ohio.

COLUMBUS, OHIO, February 24th, 1911.

The foregoing report and findings having been examined by us, respectively the Governor of the State of Ohio, and the Attorney General of the State of Ohio, the same are in all respects approved this 24th day of February, 1911.

(Signed) JUDSON HARMON,

Governor of Ohio.

(Signed) TIMOTHY HOGAN,

Attorney General of Ohio.

THE POLLUTION OF THE LITTLE MIAMI RIVER BY THE VICTOR STAMPING WORKS AT TWIGHTWEE, SYMMES TOWNSHIP, HAMILTON COUNTY.

In 1908 complaint was made to the State Board of Health of the pollution of the Little Miami River by the sewage and other wastes from the plant of the Victor Stamping Company at Twightwee. An investigation and report was made by a committee of the Board and the report

was published in the Board's 1908 Annual Report. A copy of the committee's report was also sent to the company in October, 1908.

In October, 1909, the superintendent of the Victor Stamping Co.'s works asked the State Board of Health for advice and recommendations for satisfactorily handling the sewage from this plant.

The acting chief engineer made another inspection and a letter was sent to the company outlining a design for sewage purification works for treating the sewage from the village of Twightwee and that from the company's works. It is understood that the company would submit sketch plans for criticism and suggestions within a month or two.

No plans were submitted and in January, 1910, the company was urged to take steps in the matter so that plans might be carried out before the summer season. Nothing was done, and in February the company was notified that unless steps were taken to abate the nuisance complained of the State Board of Health would have to proceed under the provisions of the Bense Act.

At a meeting of the Board held April 20th, 1910, the superintendent of the Victor Stamping Company's works was present and urged that the pollution of the Little Miami River complained of was slight in amount and not sufficient to require the company to install a disposal plant.

After considering the report of its committee the Board sustained the complaint and notified the company that the Board would expect it to submit plans at the next meeting, June 29th, 1910.

At this meeting plans were not submitted and the Board voted to issue an order requiring that plans be submitted on or before August 10th, 1910. Owing to the absence of the Governor and the Attorney General it was not possible to secure their approval of the order and at the meeting held July 27th, 1910, the time for requiring the company to submit these plans was extended to three months from the date the Board's order was approved by the Governor and Attorney General, and the limit when the changes and improvements were to be made was fixed at May 1st, 1911.

December 6th, 1910, the following order was issued to The Victor Stamping Company, at Twightwee, Ohio:

AN ORDER OF THE STATE BOARD OF HEALTH TO THE VICTOR STAMPING COMPANY.

WHEREAS, The State Board of Health of Ohio, having under consideration the conditions existing in and adjacent to the village of Twightwee, Symmes Township, Hamilton County, Ohio, as set forth in the complaint, in writing, made to said State Board of Health by the board of health of Symmes Township, Hamilton County, Ohio, as required by Section 1 of an act of the General Assembly of Ohio entitled "An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution," passed April 7th, 1908. (O. L. 99 p. 74) did, in accordance with

the duties imposed upon said Board by said act, pursue all and singular the requirements and duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint, and

WHEREAS, The State Board of Health after investigating the conditions complained of, found that the Little Miami River at Twilight is polluted by the sewage and other wastes from the Victor Stamping works and that the conditions thereby created are detrimental to the comfort of persons living in Symmes Township, Hamilton County, in the vicinity of said stream, and

WHEREAS, Acting pursuant to the requirements of the act aforesaid, said State Board of Health thereupon on the 28th day of October, 1908, notified The Victor Stamping Company of its findings and offered to assist the said company in abating the nuisance, and said company failing to take any action in the matter was given an opportunity to be heard before said Board, and

WHEREAS, On the 20th day of April, 1910, pursuant to a notice given April 13th, 1910, there appeared before the State Board of Health Mr. John A. Knecht, superintendent of The Victor Stamping Company, representing said company, and the matters contained in said complaint were discussed and argued by him in the presence of said Board, and

THEREUPON, after such hearing and argument, the State Board of Health found and determined that certain improvements or changes in said conditions aforesaid were necessary and should be made; that The Victor Stamping Company should present to the State Board of Health, at its meeting to be held June 29th, 1910, plans for the abatement of this nuisance:

AND WHEREAS, The said Victor Stamping Company having failed to submit plans to the State Board of Health at its meeting held June 29th, 1910,

THEREUPON, the said Board did order that The Victor Stamping Company be required to submit plans to said Board for the abatement of the nuisance complained of within three months from the date of the approval of the Board's order by the Governor and the Attorney General, and that said company shall make such changes and improvements as regards the disposal of sewage and other wastes on or before May 1st, 1911, as will remove the nuisance complained of to the satisfaction of the State Board of Health.

THEREUPON, on motion duly seconded, the report and findings of said State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by the State Board of Health of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

(Signed) C. O. PROBST,

Secretary of the State Board of Health of the State of Ohio.

September 24th, 1910.

COLUMBUS, OHIO, December 6th, 1910.

The foregoing report and findings having been examined by us, respectively, the Governor of the State of Ohio, and the Attorney General of the State of Ohio, the same are in all respects approved this 6th day of December, 1910.

(Signed) JUDSON HARMON,

Governor of Ohio.

(Signed) TIMOTHY S. HOGAN,

Attorney General of Ohio.

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REPORT ON TYPHOID FEVER INVESTIGATIONS.

The State Board of Health was called upon to investigate outbreaks of typhoid fever in a number of places, and this work was assigned to Dr. H. M. Platter who submitted the following reports:

REPORT ON TYPHOID FEVER AT DERWENT.

March 25th, 1910, I visited Derwent, Guernsey County, to investigate typhoid fever conditions.

Derwent is a mining town of 500 inhabitants situated on Wills Creek about ten miles from Cambridge.

Since September, 1909, there have been forty-five cases of typhoid in the village. In December, 1909, special typhoid blanks were sent to the township clerk with a request that a detailed history of each case be obtained. Compilation of the information so obtained indicated that the first case was imported and that the disease spread from family to family through visiting and the very common practice in rural communities of neighbors assisting in nursing. Analysis of water from two wells showed one, the Campbell well, to be badly polluted.

On visiting Derwent, I found that the first case was imported, that it was atypical, a "walking typhoid" and that the family was extremely careless in the disinfection of the discharges. Later this family had five other cases. In short, the health officer informed me that with two exceptions all cases could be traced to association with a previous case. The health officer also informed me that one-half of the people who drank water from the Campbell well, which was condemned, developed typhoid. At present there are but two cases in the village but the township trustees and health officer are extremely anxious to prevent another outbreak this year.

I find that the "fever district" of the village is low, wet and bordered by swamp land. The water supply is derived from surface wells with an average depth of about 18 feet and in some instances are not properly protected from pollution from the top. (This is so in the Campbell well.)

Privies are mere pits in the damp soil and in several instances are filled to the top. In rainy weather they evidently overflow.

I advised the board of health to see that all vaults were cleaned to the bottom and filled with clean earth and abandoned and that the dry box closet should be installed.

I would also advise that all refuse be removed from the premises. The health of this section of the village would be much improved if the stagnant water could be drained by ditching or tiling to Wills Creek.

I further advised the health officer to see that the discharges from any fever case were thoroughly disinfected.

REPORT ON TYPHOID FEVER AT CANAL DOVER.

On June 20th, 1910, the health officer of Canal Dover reported to the State Board of Health that typhoid fever was prevailing to an unusual extent and requested assistance in locating its cause.

The investigation was begun on June 22nd. All physicians practicing in Canal Dover were visited and supplied with Widal's, typhoid literature and special typhoid blanks in order that a close history of each individual case might be obtained. At that time there were in the city thirty-four known cases of the disease and six suspects. (These six later developed the disease so that it may be said that there were forty cases.) All of the cases and suspects were localized on the east side of the city in a territory of six blocks east and west by five blocks north and south. In several of the families there were two or more cases developing within two or three days of each other.

Canal Dover has a population of 7500. Its water supply is derived from a series of driven wells in the northern part of the city. Apparently there are no sources of contamination near save three privies some 200 feet away which were ordered abandoned. The wells are properly protected from surface pollution. Analysis of two samples of the public water supply, one taken in the square and the other in the heart of the fever district show it to be of excellent quality.

Tabulation of the individual cases showed forty cases in thirty families and that milk from one dairy had been used by all save two of the cases, though in two other cases the typhoid patient denied ever using milk in any form.

Naturally attention was directed to the dairy, its water supply, the health of the milk handlers and others at the dairy farm.

The dairy is located about mile east of Canal Dover. The house is situated near the top of the hill. Just below it, about 25 feet, is the well driven to a depth of 58 feet and cased to the bottom. At the top it is protected by a cement covering and filled with an iron pump. The cow barn is located at the foot of the hill some 250 feet below the well. The barn is fairly well ventilated and has a cement floor. About 50 feet south of the barn and, up the hillside a spring house is located where the milk is cooled. The water is piped to the spring house from the top of the hill to the south a distance of 1400 feet. The source of the spring was tapped and the spring covered up. Analysis of samples of water taken from the dairy well and from the spring shows both waters to be of excellent quality.

At the dairy no history of recent illness was obtainable save that of Mrs. M's father who died in the hospital at Canal Dover, April 26th, following an operation. The dairyman, Mr. M., had typhoid 25 years ago and a daughter now aged eleven, had typhoid in 1905. This she acquired in visiting at a typhoid home in the neighborhood. Eight other

members of the family and one employee have never had the disease. To eliminate the question of a carrier at the dairy, Widals and feces were obtained for examination in the laboratory. The results were negative.

This dairy is estimated to supply about one-eighth of the milk to Canal Dover. The milking is done by Mr. M, his two sons and one employee who has been in his employ for twenty months. After milking, the evening's milk is set to cool in five gallon cans in the spring house. The output of the dairy is forty gallons per day. But one delivery is made daily. The evening's milk, twenty gallons, is emptied into a twenty-five gallon can, equipped with a spigot and is delivered first. On the same wagon, the morning's milk is carried in smaller cans. When the large can is emptied it is refilled from the smaller cans and the delivery completed. The delivery boy has delivered the milk for over two years. He states he has never sold milk except from the large can. (This statement is probably true since the large can is the only one equipped with a spigot.) All milk is sold in bulk and from the large can. The infected territory received the evening's milk but in addition, the same evening's milk is supplied to twenty-seven families outside of the infected district and to sixty-eight within it. In these outside families there are no cases nor suspects. Among the families supplied with morning's milk, there are no cases nor suspects.

On two occasions Mr. M purchased five gallons of milk to add to his supply. This was purchased from a Mrs. A. In the A household there have been two cases of typhoid in former years. There is no history of recent illness in the family. Analysis of two samples of water from the A spring shows it to be polluted but the dates of purchase of milk, June 18th and 19th, were five days after the appearance of typhoid in Canal Dover and the milk obtained from the A's was used to piece out at the end of the route. Similarly young M occasionally purchased milk from a Mr. B, but this milk too was used at the end of the route and not at the beginning.

The Infected District. This, as previously stated, is a territory six blocks east and west by five blocks north and south. In its center is an old cemetery. Sewers are accessible but in many instances the sewer has not been tapped and the hole-in-the-ground privy and cesspool is much in evidence. No night soil disposal has ever been practiced, simply a new pit has been dug and the old filled.

In this territory are a number of wells driven to a depth of 50 to 60 feet through sand and gravel. Analyses show these wells to be safe but certainly the time is not far distant when the natural filters will no longer work and the well will become polluted. The typhoid history of Canal Dover would suggest the operation of some local causes for 75 percent of the typhoid reported in former years has been in this same territory. It should be stated, however, that all cases have not

been reported in former years and this centralization may be more fanciful than real.

By streets and numbers typhoid has been reported as follows:

		126	130
	207	223	201
East 2d St.....	211	224	316
	302	231	446
	331		314
East 5th St.....	401	222	404
	426		
			109
			414
East 8th St., 1 case no number.		Race Street	565
			606
			731
			R 511
	89		
Cross St.	409	Front Street	221
Rear 300—Place			327

Age. Twenty of the first forty cases are above 21, the oldest a man of 70. Twenty are below 21, the youngest a child of 14 months.

Time of Seizure. Of the first forty cases, all were reported as typhoid or classed as suspects between June 13th and June 23d. The time of first illness varies from June 5th to 15th as nearly as could be ascertained. (See table of cases appended.)

Flies. The majority, nearly all, were reported before the fly was much in evidence. The weather during the first two weeks in June was cold. Remembering that the infection was received during the latter part of May the fly cannot be considered as a cause of the outbreak.

Contact. Practically all of the forty cases developed in so short a time that contact must be ruled out save possibly cases 8, 10, 19, 20 and 32. Here family relationship and association with case 19 might enable us to classify them as a family outbreak.

Explosive character of the epidemic and the high percentage of cases among women and children would indicate that infected milk was the probable cause of the outbreak. However, the freedom from recent illness at the dairy home, the negative results of Widal and fecal examinations, together with the fact that there are still eight members of the dairyman's household who have never had typhoid would indicate that the dairy was not to blame. It is probable that all of the original forty cases received their infection from one delivery of evening's milk and the later cases reported can be explained either from association with previous cases or "walking" cases who did not consult their physicians until the second or third week of the disease.

To contaminate the milk supply on one evening, it would be neces-

sary either for Mr. M. to purchase milk from a family in which there was a case of typhoid or for a person having typhoid or having recently recovered from it to assist in the milking or the care of the milk on *one* evening or for K. M. to infect the milk on the route. (To substantiate the latter theory it would be necessary to show his association with some family in which there was an earlier case than any reported, a case having typhoid in the latter part of May.)

It is suggested that Canal Dover should take steps to supervise its milk supply and that strict rules and regulations governing the sale of milk should be adopted. It is also suggested that the board of health should compel the abandonment of the hole in the ground privy. Where sewers are accessible the residents should be required to tap the sewer and where sewers are not accessible, the water-tight vault or dry box closet should be installed.

The health officer advises under date of August 3d that the outbreak has practically ceased. The total number of cases reported was fifty-four. Deaths four.

TYPHOID FEVER CASES AT CANAL DOVER.

JUNE AND JULY, 1910.

No.	Date first illness	Phys. visit	Date report	Name	Age	St. Number	Water	Milk	Cre m	Veg.	Contact	Disinfectant used	Physician	Remarks
1	6-4	6-5	6-13	H. R., plumber	22	211 E. 2nd St.	Hydrant	M.	K.	K.	No	Line	Douthitt	In Canton, O., May 17, wife sick 6-22. Privy on premises.
2	6-12	6-13	6-15	W. H., steel w'kr	24	109 Race St.	Dr. well	"	"	"	"	& Ac. Carb.	Goodrich	Privy. Slop thrown on ground. Well not properly protected.
3	6-12	6-13	6-11	E. H., C. N., steel w'kr	18	"	50 ft. Dr. well.	"	"	"	"	"	"	Privy and cesspool.
4	6-5	6-7	6-18	Mrs. N. H.	27	231 E. 3rd St.	Dr. W. at work	"	No	H&H	"	"	"	Privy. Sanitary surroundings good.
5	6-5	6-7	6-18	Mrs. E. H.	30	409 Cross St.	Hydrant	"	"	own	"	"	"	Privy. Husband sick 5-19. Contact? Case fatal. Intestinal hemorrhage.
6	6-5	6-7	6-18	Mrs. E. H.	32	223 E. 3rd St.	"	"	"	own	"	"	"	Two cases. Developed same time.
7	?	6-16	6-20	{ Mrs. M. B. M.	38	731 Race St.	"	"	"	"	"	"	Schauwecker	" " " "
8	?	6-15	6-18	E. W., carpenter	16	224 E. 3rd St.	"	M. & S.	S.	H.	"	"	"	Privy.
9	?	6-15	6-18	H. W.	24	224 E. 3rd St.	"	M.	"	"	"	"	"	Privy.
10	?	6-16	6-18	Mrs. L. H.	14	426 E. 5th St.	"	"	No	own	"	"	"	Privy.
11	?	6-17	6-19	P. B.	25	Rt 511 Race St.	"	"	"	H.	"	"	"	Privy.
12	?	6-18	6-19	H. G.	32	327 E. Front St.	Well, driven	"	"	own	"	"	"	Privy. Contact. See next case.
13	?	6-18	6-20	A. K.	10	133 E. 3rd St.	"	"	"	"	"	"	"	Privy.
14	?	6-16	6-20	H. W.	1	222 E. 6th St.	Hydrant	"	"	"	"	"	"	Privy.
15	6-14	6-16	6-20	C. W.	8	201 E. 4th St.	"	"	"	"	"	"	"	Privy.
16	6-12	6-18	6-21	Mrs. G. S.	56	201 E. 4th St.	"	"	"	"	"	"	"	Privy.
17	6-6	6-19	6-20	Mrs. J. H. M.	—	401 E. 5th St.	"	"	"	"	"	"	"	Privy.
18	6-20	6-20	6-20	Mrs. J. H. M.	—	401 E. 5th St.	"	"	"	"	"	"	"	Privy.
19	?	6-16	6-20	Mrs. S. W.	50	207 E. 2nd St.	"	"	"	"	"	"	"	Privy.
20	6-11	6-16	6-18	R. W., U. S. salesman	24	401 E. 7th St.	"	"	"	"	"	"	"	Privy.
21	?	6-16	6-18	J. M., laborer	18	401 E. 7th St.	"	"	"	"	"	"	"	Privy.
22	?	6-16	6-18	J. M., laborer	18	401 E. 7th St.	"	"	"	"	"	"	"	Privy.
23	6-5	6-18	6-20	A. S.	71	516 E. 4th St.	"	"	"	own	"	"	"	Case fatal.
24	?	6-18	6-20	C. S., teamster	27	731 Race St.	"	"	"	"	"	"	"	Privy.
25	?	6-16	6-20	Mrs. O. M.	17m	606 Race St.	Dr. well	"	"	"	"	"	Schauwecker	Case fatal.
26	?	6-17	6-20	M. H.	17m	606 Race St.	"	"	"	"	"	"	"	Case fatal.
27	?	6-19	6-20	O. H., delivery boy	15	89 Cross St.	Dr. well	"	"	"	"	"	"	Case fatal.
28	6-9	6-19	6-21	J. R., rds. st. w'ks.	28	Rt 322 Cross St.	Hydrant	"	"	"	"	"	"	Case fatal.
29	?	6-18	6-19	Mrs. A. H.	33	416 E. 4th St.	"	"	"	"	"	"	"	Case fatal.
30	?	6-19	6-20	Mrs. W. P.	33	416 E. 4th St.	"	"	"	"	"	"	"	Case fatal.
31	6-5	6-11	6-20	R. D., rolling mill	53	203 E. 2nd St.	Well (dug)	"	"	"	"	"	"	Case fatal.
32	?	6-19	6-19	W. C.	19	111 Race St.	Well & Hyd.	"	"	"	"	"	"	Case fatal.
33	?	6-19	6-19	W. C.	19	111 Race St.	Well & Hyd.	"	"	"	"	"	"	Case fatal.
34	6-10	6-16	6-19	O. S.	6	234 E. 3rd St.	See cases 8 and 9	"	"	"	"	"	"	Case fatal.
35	?	6-19	6-19	O. S.	6	234 E. 3rd St.	See cases 8 and 9	"	"	"	"	"	"	Case fatal.
36	?	6-19	6-25	E. M.	10	401 E. 5th St.	Hydrant	"	"	"	"	"	"	Case fatal.
37	6-10	6-11	6-25	L. G.	10	401 E. 5th St.	See cases 8 and 9	"	"	"	"	"	"	Case fatal.
38	6-9	6-22	6-25	Mrs. P. S.	29	505 Race St.	Hydrant	"	"	"	"	"	"	Case fatal.
39	?	6-21	6-21	F. M., laborer	51	150 E. 14th St.	Well driven	"	"	"	"	"	"	Case fatal.
40	?	6-19	6-21	T. L., laborer	33	212 E. 8th St.	Hydrant	"	"	"	"	"	"	Case fatal.
41	?	6-14	6-20	J. M., laborer	35	221 E. Front St.	Well	"	"	"	"	"	"	Case fatal.
42	before 6-15	6-30	7-1	Mrs. R.	21	416 E. 5th St.	Hydrant	"	"	"	"	"	"	Case fatal.

JUNE AND JULY, 1910.

TYPHOID FEVER CASES AT CANAL DOVER.—Concluded.

No.	Date first illness	Phys. first visit	Date of report	Name	Age	St. Number	Water	Milk	Creep.	Veg.	Contact	Disinfectant used	Physician	Remarks
41	6-4	6-24	6-28	C. S.	7	314 E. 7th St.	Well & Hyd.	M. b'd	No	own	No	{ Lime & Ac. Carb.	Wagner	Privy. Drank well water for 3 w'ks. Ret'd from Wheeling, W. Va., 5-15.
42	6-4	6-4	6-29	B. O.	25	212 Wooster St.	Hydrant	B.	No	K.	"	"	Douthitt	(Imp'd.)
43	6-4	6-4	7-1	T., teamster	46	E. Front St.	"	M.	"	G.	"	"	Shumaker	Does not use milk.
44	6-28	7-1	7-4	N. T.	9	"	"	"	"	"	"	"	"	Related to cases 19-20. Con. probable
45	6-25	7-1	7-2	R. S.	18	E. 2nd St.	Dug well	"	"	own	Yes	"	Schauwaker	Second case in family.
46	6-27	6-28	6-30	R. G.	21	88 Cross St.	Bad well	H.	"	own	No	"	Morsfelder	Former patient Dr. Smith. Not of present outbreak.
47	4-1	?	7-1	E. N., laborer	21	413 Washington	Well (cont'd)	"	"	"	"	"	"	Typhoid in family 1908.
48	6-	6-30	6-30	T. L.	4	W. 7th St.	Well	E.	No	B.	No	"	Morsfelder	
49	6-	7-11	7-12	R. K.	25	237 E. Front St.	Well	"	"	own	"	"	Schauwaker	
50	6-16	7-10	7-12	Mrs. A. S.	63	516 E. 4th St.	See cases 23 & 24	"	"	"	Yes	"	Mersfelder	
51	6-16	7-11	7-12	J. R., Grocer	47	89 Cross St.	"	"	"	"	"	"	Schauwaker	
52	6-20	7-8	7-9	J. W.	16	226 E. 6th St.	"	"	"	"	"	"	Morsfelder	
53	6-20	7-9	7-12	Mrs. S.	35	E. 2nd St.	Well	M.	No	"	"	"	"	

53 Cases 17-36 Families.

LATER TYPHOID CASES DEVELOPING IN CANAL DOVER DURING AUGUST AND SEPTEMBER.

INFORMATION FURNISHED BY H. H. PRINCE, H. O.

No.	Date first illness	Phys. first visit	Date reported	Name and Occupation	Age	Street Number	Water	Milk	Physician	Disinfectants	Contact	Remarks
54	Not given	Not given	Not given	Miss S.	—	410 E. 3rd St.	Own well	B. & L.	—	Not given	—	No other date given
55	8-1, 1910	8-8, 1910	8-15, '10	B. A.	11	110 Pine St.	City	"	Wagner	Coppers, but not b'd	No	Flies many. 5 others in family
56	Not given	Not given	Not given	Mrs. B. H.	—	605 Race St.	Dr. well	{ M. before d'ts illness now E.	Not given	Not given	Yes	Daughter has had typhoid since June 16, 1910
57	"	"	"	Mrs. E. H.	—	414 Cross St.	—	"	"	"	—	
58	"	"	9-3	Mrs. G.	—	E. Third St.	Own well	Condensed	"	"	—	
59	"	"	9-3	Miss G.	—	E. Third St.	"	"	"	"	?	
60	Before July 19	7-19	7-21	G. S., rolling mill, Canton, O.	18	{ Since June 18, 210 Union Av., Prior to illness, 1615 (Late St., Canton, O.	Hyd.	?	Wagner	Ac. Carb. Coppers	No	Ill when he returned to Canal Dover. Imported.

REPORT ON TYPHOID CONDITIONS AT THE GIRLS' INDUSTRIAL HOME,
DELAWARE.

At the request of the Secretary I visited the Girls' Industrial Home July 16th to investigate the typhoid fever situation. Investigation was called for because of a letter of inquiry from Mr. Copeland, chief chemist of the water purification works of Columbus.

There have been since March 24th, eight cases of typhoid fever at the institution and one suspect, as follows:

Case 1, R. B., date of first illness, March 24th, resident of cottage 1.

Case 2, A. R., date of first illness, May 8th, resident of cottage 2, later, cottage 7.

Case 3, K. G., date of first illness, May 16th, resident of cottage 1.

Case 4, E. N., date of first illness, May 21st, resident of cottage 8.

Case 5, L. H., date of first illness, June 18th, resident of cottage 8.

Case 6, C. P., date of first illness, June 23rd, resident of cottage 8.

Case 7, G. S., date of first illness, June 24th, resident of cottage 6.

Case 8, L. T., date of first illness, July 10th, resident of cottage 8.

Case 9, E. C., date of first illness, July 12th, resident of cottage 1. The diagnosis in this case is not yet positive.

I find that all these cases have been isolated in one ward in the hospital and that extreme care has been taken to thoroughly disinfect all discharges. The discharges have been received in a solution of carbolic acid, 1-40, in which they are allowed to stand one hour before being thrown into the flush. Clothing and basins are disinfected first by boiling and later washed in a solution of formaldehyde.

The cause of the outbreak is problematical. The double system of water supply is still in use and raw Scioto River water is accessible to all inmates though the inmates have been warned against using this for drinking purposes. Many who stated that they did not drink the raw river water admitted they used it in brushing the teeth.

Mr. Copeland in his letter of July 9th, stated that he had been informed that no closet was provided for those inmates engaged in gardening. I find upon investigation that this is an error. I might also add that no cases or suspects have developed among the gardeners.

Mr. Copeland, in his communication, also calls attention to a spring which has been condemned in former years. I am informed that this spring has not been condemned by analysis but rather by tradition. It is related that in former years people who drank water from this spring developed typhoid fever. A notice is posted upon the dilapidated spring house, warning all against its use. The attendants are quite positive that this water has not been used for drinking or other purposes.

I am unable to see what advantage could be gained by tiling the water from this spring to the Scioto River for, if it is contaminated, it will then as now still continue to contaminate the Scioto River.

The preponderance of cases of typhoid this year has been in cottage 8, where the majority of cases occurred last year. This is the colored cottage and has over 100 inmates. It is possible that the colored inmates are not as careful in regard to cleanliness and following the advice of the attendants as are the residents of other cottages. The sanitary surroundings of the cottage are excellent aside from the condition of overcrowding, which it is not possible to remedy. It is quite likely that so long as the inmates are able to obtain the raw Scioto River water that cases of typhoid will occur at the institution.

I feel that the management is to be condemned for the care and judgment they are using in controlling the individual cases now confined in the hospital.

REPORT ON TYPHOID FEVER AT KACHELMACHER, GREEN TOWNSHIP, HOCKING COUNTY.

On July 19th, 1910, in response to a request from the officials of the Columbus and Hocking Clay and Brick Manufacturing Company, an investigation into typhoid conditions was made. One year ago typhoid fever was epidemic and this year the reappearance of the disease caused the request for investigation.

The settlement of Kachelmacher comprises about thirty houses located about one-half mile from the C. & H. C. & I brick plant. There are at present five cases of typhoid in this settlement, three cases in one family. Four of the cases are clearly of contact origin. No history of being away from home was obtainable from the original case. This man, the first case, drank water from a surface well situated at the foot of a hill toward which there is drainage from a vault, situated on the hillside. This well is now abandoned.

Samples of water from three wells were taken, one at the settlement of Kachelmacher and two from wells in the vicinity of the brick plant.

If the analysis of the water of the well at the settlement shows it to be of good quality, it would be advisable for the company after properly protecting it from pollution to install a wind pump and tank and pipe the water to the various dwellings. (Analysis showed this water to be of good quality.) There are several surface wells in bad repair now in use which could then be abandoned.

The location of privies on the hillside, higher than the house and well is to be condemned. The old pits should be treated with lime, cleaned, filled with clean earth and abandoned. On account of the clay soil and tendency to overflow in wet weather, it is doubtful whether a water-tight vault could be employed. The most satisfactory solution of this problem would be a dry box closet.

Directions were given the families in which there are typhoid cases to thoroughly disinfect the discharges of the individual cases during illness and for one month after apparent recovery.

REPORT ON TYPHOID FEVER AT UHRICHSVILLE AND DENNISON.

On August 15th, 1910, Dr. R. H. Grace, a member of the board of health of Dennison, sent to the office of the State Board of Health several samples of the water supply of Dennison, asking for an analysis. Dr. Grace stated that typhoid fever was prevalent. The samples were sent in fruit jars. Dr. Grace was advised that the samples were not suitable for analysis because of the containers used and again because the bacterial samples were not iced. Special typhoid blanks and typhoid literature were sent him in order that a history of the individual cases might be obtained.

On August 19th, an investigation was made at Dennison and Uhrichsville. Samples of the public water supply were obtained from the reservoir after treatment and from the tap. A complete description of the water purification plant will be found on pages 96-108, "Water and Sewage Purification Plants in Ohio," 1908. Analysis of these samples shows the public water supply to be of good sanitary quality.

Tabulation of individual cases shows that there has been in Uhrichsville seven cases of typhoid and in Dennison nineteen cases since July 14th. A number of the Dennison cases can easily be traced to contact and again several of the other cases not so accounted for are in a new addition and would suggest that these too may be found on close study to have associated with other cases.

The information compiled by the local health officials was deficient in that the date when the patient first complained of being ill was not given and association with other cases had not been inquired into in all cases. The date of first visit of physician of the earlier cases is generally given as from July 14-20th and would suggest the infection to have been received about July 1st. The local authorities were advised to obtain a more complete history of the individual case and to see that the discharges were thoroughly disinfected.

No preponderance of cases is shown on any milk route and no illness was found at any dairy farm.

No typhoid cases were found along the watershed. Investigation of a rumor of a case of typhoid at Stillwater showed the report to be without foundation. With water and milk eliminated as causative factors, thorough disinfection of discharges, together with the isolation of the typhoid case to prevent the development of contact cases, should soon witness a cessation of the outbreak.

REPORT ON TYPHOID FEVER AT LOCKBOURNE.

Lockbourne is a straggling village of 350, situated in the southern part of Franklin County. On August 25th the health officer reported that typhoid fever was unduly prevalent. An investigation showed six cases in six different families. Cases 1, 3, and 4 gave a history of as-

sociation with each other as did cases 2, 5, and 6. Later, the health officer advised the department of the development of four other cases in three new families. A close history of these later cases shows that one, Mrs. F. had "walking typhoid" and was sick at least from August 13th to August 28th before a physician saw her. During this interval she cared for the milk and butter at B. K's. It is significant that Mrs. K. later developed the disease as well as case 9, a milk customer.

I am informed that there was one earlier case of typhoid in the village with which case 1 was associated. This was a man who came to Lockbourne sick with measles late in June. Following measles he developed a fever and returned to West Virginia where he died from typhoid.

Bearing in mind that case 1 obtained milk from K's, it is possible that in some manner the infection was communicated to Mrs. F. and by her to cases 8 and 9.

The sanitary conditions of the village are bad. Many hole-in-the-ground privies are in need of cleaning and many of these privies are located within dangerous distance of dug wells whose platforms are in need of repair to protect against surface pollution.

Analyses of samples of water from these wells show many of them to be dangerously polluted.

It is probable that the original case of fever was imported, and that through unsanitary conditions and association with cases of the disease that it has been spread from family to family.

REPORT ON TYPHOID FEVER AT MCCUTCHENVILLE, TYMOCITTEE TOWNSHIP, WYANDOT COUNTY.

On October 5th the health authorities advised the State Board of Health that typhoid was prevailing in epidemic form in McCutchenville and vicinity and requested assistance in locating its source. McCutchenville is not incorporated. Its population is 350. Its water supply is derived from individual wells.

On October 6th an investigation was begun. The attending physicians, Drs. Heaton and Heaton, were supplied with blanks to obtain a complete history of each case and a number of the earlier cases were visited. The earliest cases of fever in the hamlet occurred in the families of Mr. A., the hotel keeper and Mr. B. the proprietor of a popular restaurant.

In the A. family the first recognized case of typhoid was a daughter, Juliet, whose date of first illness is given as August 14th but in this family there had been three other cases of fever, and the first fever case was a son who had fever early in July. Following him came a sister and then the mother who was seen by Dr. Heaton on August 1st. All save the patient, Juliet, were only mildly sick and the first two cases were not attended by a physician.

In the B. family, Frances aged 16, was first seen by a physician on August 11th but she had been sick for over a week previously. Her case was pronounced typhoid on August 18th. She was a clerk in her father's restaurant and waited on trade up to August 14th. Within a week after taking her bed, the other members of the family had mild febrile attacks and diarrhoea lasting about a week and then recovered. During the illness of the other members of the family and throughout the illness of Frances, Mr. B. and his wife continued to wait upon their customers as well as to care for their sick. Two visitors to the B. home, residents of California, now have typhoid and a brother's family residing next door, users of water from the same well and patrons of the restaurant had three cases of the disease.

From information furnished, nearly every case developing in the village and vicinity was a patron of the restaurant and hotel. These families are now recovered. Frances B. spent several days in Fostoria about the middle of July visiting a family by the name of C.

Local authorities were advised to see that discharges of present patients were disinfected, pamphlets on prevention were left in each home and samples of water were taken from the A. well, the B. well and the town well.

The evidence at hand would indicate that the source of the epidemic was likely traceable to the first cases in the B. and A. families and that through the practice of caring for the sick and attending to their customers, the food, particularly milk, ice cream and raw foods, was infected.

REPORT ON TYPHOID FEVER IN MIDDLEBURY TOWNSHIP, KNOX COUNTY.

On October 19th in answer to a request for assistance from local authorities an investigation was made of typhoid conditions in Middlebury Township, Knox County.

In the unincorporated village of Waterford and vicinity there have been eight recognized cases of typhoid fever since July 20th. Five of these cases are clearly of contact origin. At present in the village there are cases in five different families. All cases are being cared for by trained nurses and the discharges are being thoroughly disinfected.

Analysis of water from the town well shows it to be of good quality. Contrary to the usual custom, drilled wells are the rule, not the exception, and the privy is not its near neighbor.

I am informed there are five or six cases in the surrounding country who were frequent visitors to the village. It seems impossible to determine the source of the outbreak. The attending physician informs me that there has been an unusual number of cases of bowel trouble in this territory and it is possible that some of these may have been mild typhoid.

On August 10th and 12th two picnics were held in the village. These were largely attended and may have served as the medium through which the disease was disseminated. There is nothing in common to be found in the milk supply. Nearly all have their own cow and the water supply as before stated is derived from a drilled well in nearly all cases.

With the exercise of care in the disinfection of discharges such as is now being practiced, there is no reason why conditions should not improve. Analysis of samples of water from several sources shows it to be safe, save in one instance, the Levering case, the last case to develop.

REPORT ON TYPHOID FEVER IN WASHINGTON TOWNSHIP, WARREN
COUNTY.

On November 9th, 1910, in answer to a request from Dr. A. C. Roberts of Morrow, investigation was made of a typhoid outbreak occurring in Washington Township, Warren County, in the vicinity of Fort Ancient.

Since September 1st, there have been nine cases of typhoid in three families living in Washington Township, near Fort Ancient, and locally many attributed the outbreak to fly infection. Report had it that several cases of typhoid occurred among the soldiers during their encampment at Fort Ancient in the latter part of August. The Adjutant General's office, however, states that there was very little illness of any description among the soldiers and no typhoid.

In early August, Dr. Roberts treated a Mr. W. for a febrile attack which he at that time thought malarial. Later Mrs. W. suffered a similar attack. Investigation shows that the first cases occurring in two of the families now attacked, were visitors at the W. home during the illness of Mr. W. and his wife and probably derived their infection from this source. Later cases in these families quite likely are of contact origin.

In the S. family, however, there is no history of associating with other cases. Apparently the first case was a child, Robert, aged 4, who had not been away from home. Three other cases developed in this household. The S. family occupies a new home and while they have not properly protected their well from possible surface pollution, it is extremely unlikely that the disease originated there. Mr. S., the father, states that he was not in good health during August prior to his son's illness. It is probable that in this family he was the first case and that later cases developing were of contact origin and that the disease was acquired away from home. It is impossible now for these men to remember where they were in early August so that the exact source cannot be located but it seems likely that the infection in each instance was acquired away from home.

REPORT ON TYPHOID FEVER AT JACKSON.

An investigation was made of a typhoid fever outbreak at Jackson, Ohio, on November 16th and 17th. It was found that since July 15th there had been twenty-nine cases of the disease with four deaths.

The disease is not distributed generally over the village, but for the most part confined in a territory about three squares each way. This district is low and swampy and subject to overflow each spring. Surface wells equipped with windlass and hole-in-the-ground privies are the rule. It is stated that the wells of this district become so foul that it is necessary to clean them each spring. It is evident that nearly all of them are unsafe to use at any time. In addition most of the families attacked are accustomed to visit back and forth and one of these families in which there have been six cases has sold milk to neighbors throughout the entire time of illness. It is significant that several cases have developed among milk customers. It was found that the physician's directions regarding the disinfection of the discharges have not been carried out to any extent and in several instances the discharges have been thrown in an open privy without disinfection. Many of the houses swarmed with flies. The sanitary condition of the district is most deplorable. Aside from these cases there have been but three other families invaded in Jackson and this was much earlier than the present outbreak. The public water supply of the village is from a series of driven wells and a sample was taken for analysis. It should be stated, however, that there is little or no evidence which would serve to indict the public water supply. Certainly, nearly all of the cases are due to association with previous cases, and to contaminated food and drink and in this contamination the fly has probably played an important part as is evidenced by the fact that the outbreak is subsiding with the advent of cold weather.

It is recommended that the privies should be cleaned out and abandoned and dry box closets screened against flies should be installed. The analysis of the public water supply shows it to be of good quality and the wells of this district should be abandoned. This procedure, together with a thorough disinfection of the discharges of the individual cases should control the present outbreak and do much to prevent another outbreak next year.

REPORT ON AN INVESTIGATION OF SUSPECTED SCARLET
FEVER IN WAYNE, ASHLAND, RICHLAND, MEDINA,
AND HURON COUNTIES.

May 9th-12th, Dr. Platter visited West Salem, Wayne County; Savannah, Ashland County; Adario, Richland County; Homer Township, Medina County and Sullivan, Huron County, to investigate an eruptive.

disease which had been prevailing in that section during the winter and spring. Influenza, scarlatina and glandular fever had been diagnosed by attending physicians. Dr. Platter reported as follows:

I first visited West Salem and with Dr. Smith visited three families tentatively quarantined by him and one quarantined by Dr. W. A. Crum of Lodi. The patients all resided on farms several miles from the village. With Dr. Smith, I saw three cases in the K. family, one of whom is a married daughter, residing away from the homestead, all adults, a Mr. S., aged about 47 years and a child of about 8 years, a patient of Dr. Crum.

I saw none of these cases in the eruptive stage and can only form an opinion from the history given me by the physicians and patients.

The first case occurred about April 11th. This was the married daughter of the K's., who drove a wagon during the winter hauling children to school. Preceded by slight prodromal symptoms, a scarlatinal eruption appeared over the entire body. Sore throat was complained of. Her temperature was 102. Dr. Smith isolated the case suspecting scarlet fever. The eruption disappeared on the third or fourth day, temperature returned to normal and she felt entirely recovered. Slight desquamation was noticed over the surface. On May 9th, twenty-nine days after seizure, there was no evidence of palmar desquamation or sequela. On May 1st, twenty days after, a brother, about 21, developed the same trouble, symptoms identical, save that the eruption was more pronouncedly scarlatinal in character. Patient states that the rash disappeared on the third day. On May 9th, the date of my visit, I noted some desquamation on the neck. Patient seems entirely recovered. No complications or sequela to date. The mother, a middle aged woman, also informed Dr. Smith that she suffered from the same "rash," but was not sick, that the rash lasted three or four days and then disappeared. She shows no evidence of desquamation or sequela.

Mr. S., aged 47, called at Dr. Smith's office on May 6th. He had a pronounced scarlatinal eruption, complained of intense itching, no sore throat, normal temperature. I saw him three days later. Rash had disappeared. Had been plowing all day and felt entirely well. Says he is subject to skin eruptions.

The other patient visited was the B. child, aged 8. Attending physician, Dr. W. A. Crum of Lodi. Taken sick May 1st, complained of sore throat and developed a general rash. Dr. Crum diagnosed scarlet fever. Rash disappeared on the fourth day. I saw her on the tenth day. Was out playing. No eruption, no desquamation as yet, no sore throat or glandular enlargement, appetite good, seems entirely recovered. Two other small children in the family in close contact with her are perfectly well. This child was taken to school in the wagon of Mr. K.

This completed the inspection out of West Salem. All known cases were visited.

From the foregoing history, I can hardly subscribe to the diagnosis of scarlet fever. The low temperature in all the cases, the fact that three out of four were adults, the disappearance of the eruption on the fourth day and the freedom from complications or sequela together with the absence of palmar desquamation seems to me to indicate that the trouble was German measles with an eruption of scarlatiniform character. In the case of Mr. S., it is possible that he merely suffered from an erythema. However, I advised Dr. Smith not to release the cases from quarantine since no hardship was being imposed as the patients reside on the farm but to study carefully any new cases developing. I did not think it wise to pass final judgment when no eruptive cases were to be seen.

On May 10th, I visited Savannah, Ashland County. About three miles from the village, I saw two children in the R. family, patients of Dr. Jacoby. They had been quarantined three weeks for scarlet fever. Here I found palmar desquamation and glandular enlargement (Cervical), also history of vomiting, temperature 103 during invasion, in short all the symptoms of a case of scarlet fever of moderate severity. I recommended that quarantine be maintained until desquamation is completed. These cases, I believe are scarlet fever. Was informed there had been several mild cases of scarlet fever in the vicinity during the winter.

With Dr. Jacoby, I saw three eruptive cases near Adario, Richland County. These were school children. The eruption appeared with practically no prodromes and was maculo-papular in character with mild coryza, slight sore throat (reddened) and enlargement of post cervical glands. These cases I considered typical German measles.

At Adario I saw two cases with Dr. Glenn of Savannah. The eruption had disappeared but in one, a girl aged 17, there remained enlargement of the glands at the angle of the jaw and the sub-maxillary and sub-lingual glands as well as enlargement of the post cervical glands. The clinical history indicated German measles, but I had never seen so much glandular involvement in rotheln nor the glandular involvement remain after the eruptive stage. However, Osler, Twentieth Century Practice, Corlett and Modern Clinical Medicine record examples of epidemics of rotheln where such cases have been observed. I am told that one death from pyemia from deep cervical abscess occurred in the vicinity of Savannah and that there have been an unusual number of cases of glandular enlargement, submaxillary, sub-lingual and cervical during the winter. These sequela, of course, suggest scarlet fever, but in only one or two instances has any rash been noted.

At Sullivan, Huron County, Dr. Garrison informed me that he had had almost two hundred cases of eruptive trouble complicated with glandular involvement with no deaths. In no instance did the glands suppurate. It was not infrequent to find one or two members of the family with glandular enlargement without exanthem while others would have glandular enlargement plus the exanthem. Otitis developed in twelve cases.

Dr. Garrison states that the disease appeared in ten or twelve families within twenty-four hours, adults and children were attacked. In some instances the eruption was typical of scarlet fever and desquamation was profuse but in the majority of instances desquamation was not noted. Nephritis was not noted in a single case. Dr. Garrison stated he had regarded the trouble as a form of influenza. Mumps and measles were also noted during the outbreak. Authorities, however, state that desquamation is not found following the skin eruption of influenza.

There were no cases in Sullivan at the time of my visit. I saw one case, the H. boy, who had been sick three weeks previously. No desquamation was to be found and aside from a slight enlargement of the glands at the angle of the jaw he seemed entirely well. I am informed that some of the older physicians had diagnosed the trouble during the winter as "Glandular Fever." It has not been my fortune to see a case of this disease and modern writers seem inclined to doubt the existence of such a disease per se. Forchheimer in the Twentieth Century Practice of Medicine describes such a disease, but his definition would rule out the trouble which has been prevailing in the vicinity of Sullivan for he states that no rash is present in the disease. Considerable space is given to a description of an outbreak of glandular fever by Dr. Park West of Bellaire.

From the evidence at hand it would seem that the diagnosis of the trouble at Sullivan must rest between scarlet fever and rotheln with many arguments in favor of each. Possibly the fact that mumps was epidemic at the same time has added to the confusion. It is unfortunate that the epidemic could not have been studied during the eruptive stage. Now, there remains little to enable one to arrive at a satisfactory conclusion.

REPORT ON SITE FOR A DISTRICT TUBERCULOSIS HOSPITAL FOR THE COUNTIES OF MIAMI AND DARKE.

Upon the request of the county commissioners, Dr. Platter, on June 3rd, 1910, inspected a site for a proposed tuberculosis hospital for Miami and Darke counties. His attention was called to the Williams, or Pearson farm situated just south of the city. Dr. Platter reported upon this site as follows:

This is a tract of 60 acres. There is a large farm house upon it in excellent repair. The house is situated upon the brow of a hill about 300 feet from the road, an orchard intervening. A southeastern exposure is available for shacks. City water and light are accessible. The location possesses many advantages over the Vinnege site.

The objections to be urged against the site are its proximity to Troy and the fact that a railroad runs about 300 yards from the house.

At a meeting held December 7th, 1910, the State Board of Health approved this site for a district tuberculosis hospital for the counties of Miami and Darke.

REPORT ON AN INVESTIGATION OF THE SANITARY CONDITIONS OF THE STARK COUNTY JAIL, AT CANTON, OHIO.

At the request of the local authorities, Mr. Joseph Hartzell, member of the State Board of Health, visited the Stark County Jail on April 6th, 1910, and the following report was made:

This structure was built in 1869—over forty years ago. Unlike the County Court House, the splendid building which it adjoins, the jail is far from being in harmony with modern ideas, both as to architecture and sanitation.

Forty years ago safe and sure detention was first provided for; healthful considerations were secondary; and yet the well-being, both of the inmates and often of their outside friends, demanded that sanitary helps be not lost sight of.

MORAL INSANITATION.

The apparently unavoidable freedom of intercourse between the prisoners was first remarked. It is certainly a feature very hostile to *moral improvement*. Even a prison ought not to be of such baneful possibilities to the moral reform of those confined within its walls. It ought to be free from the reproach of putting all, even the young and well-disposed, into contact with the incorrigibly vicious.

VENTILATION.

While the steel-clad lining of the inner walls of this jail may defy escape, that feature of construction has its weakness, and these ought to be provided for.

The individual cells offer very restricted air space. Fresh, pure air is not a free gift, but it is known to be the only efficacious remedy for certain infectious diseases. Tuberculosis is an example with which people are most familiar. Prisoners are generally persons of disorderly habits, those most prone to become victims of that formidable, fatal and infectious malady. These victims are capable of giving the disease to their fellow prisoners for they, themselves, have no chance whatever of improvement.

Present day practices have brought upon society, not only the great white plague, but other infections, by inattention to proper ventilation.

BAD DRAINAGE.

If the inmate of this jail must occupy his cell continuously, day and night, the closet bowl, placed at the rear of his cell is liable to serious objection—objection which is emphasized by the small attention given to ventilation. The continuous removal from his cell of the confined air by pure fresh air would, to some extent, remedy this evil. And yet such a connection with the sewers, in view of the inherent possibilities of ingress of foul air and sickening odors, is out of harmony with modern requirement for healthy living.

Even for the temporary occupant, some form of employment, facilities for reading and reflection, would be useful. In such a cramped place no such feature of reform can be made available.

After all one must confess to an agreeable surprise at the absence of sights and smells that usually characterize such groupings. This fact is undoubtedly due to the humanitarian element of those in charge—to that more enlightened conscience which devotes itself to decency and humanity.

While this is true, and while the fact is highly creditable to the custodians; and while it must be said that there are worse conditions and worse prisons; that is no good reason for saying that the situation in the Canton jail is satisfactory. Just the contrary is true. In the respects named the sanitary condition is bad, and those in charge should apply the remedy without delay.

A copy of this report was furnished to the Stark County Commissioners.

REPORT ON THE AVAILABILITY OF SATISFACTORY WATER
SUPPLIES IN AND NEAR FT. ANCIENT WITH REFER-
ENCE TO THE USE OF THIS LOCALITY FOR EN-
CAMPMENT AND MANEUVER PURPOSES BY
THE OHIO NATIONAL GUARD.

On May 20th, 1910, the acting chief engineer visited Ft. Ancient in company with Col. Edward S. Bryant and Col. Lloyd W. Howard of the Ohio National Guard. The day of the 20th was spent at Ft. Ancient and in driving through the country lying to the eastward of the fort. The following morning was occupied in making inspections of certain springs and wells in the vicinity of the fort. The opportunities afforded by this single visit were not sufficient to entirely determine the availability of satisfactory water supplies, but pending further investigations the following report was submitted:

It is desired by Governor Harmon and Adj. Gen. Weybrecht to use Ft. Ancient and the surrounding country for the purpose of encampment

and maneuver practice extending over a period of about one week during the coming summer. The date selected for the beginning of the encampment is August 21st. The troops that will participate in the encampment consist of the 1st, 2nd, and 6th Regiments; 9th Battalion; and Troop A, all of the 1st Brigade under the command of Brig. Gen. William V. McMaken. The regimental commanders are as follows: 1st Regiment, Col. Charles Hake; 2nd Regiment, Col. Edward S. Bryant; 6th Regiment, Col. Lloyd W. Howard. The number of men comprised in each regiment will be 600 to 700; the remaining troops will total perhaps 400. The total number of men participating will range from 2000 to 2500.

The suitability of the locality for the purpose intended depends entirely on the availability of satisfactory water supplies. Two distinct problems in the matter of the water supply are presented by the conditions that will obtain during the presence of the soldiers. The first problem will result from the mobilization of the troops within Ft. Ancient, which has a total area of somewhat less than one square mile. The troops so mobilized will remain in encampment for about two days. During this time there must be available a water supply to meet all the needs for drinking, cooking, and washing by the concentrated body of troops. Furthermore, this supply must be immediately on the ground for the reason that the topography and available present sources of supply preclude the possibility of carrying water for any great distances. The second problem in connection with water supply will be encountered when the troops are in the field undergoing maneuver practice. It is expected that the maneuvers contemplated will cover an area of approximately ten square miles. During these maneuvers the regiments in the field will generally be deployed, though at times a regiment may be concentrated for encampment over night. It would appear from this that there need not be available very large quantities of water at any one point, but the soldiers must depend on such wells and other sources of supply as exist at the present time for the reason that the area covered precludes the possibility of developing new or improved supplies for the occasion.

Before the above problems can be adequately discussed, some consideration must be given to the topographical and geological conditions that obtain in and near Ft. Ancient. The fort is located in the east-central portion of Warren County on the east bank of the Little Miami River. It occupies a commanding position on comparatively level land at the top of high bluffs extending out into the river valley. The configuration of the site of the fort is such that it is almost entirely cut off from neighboring tablelands to the eastward by two deep ravines encircling the fort on the north and south. The approximate elevation of the fort above the bed of the Little Miami River is 280 feet. It will thus be seen that the site was selected for its naturally defensive location.

The table-land to the eastward is what may be termed gently undulating, though here and there, due to the erosive action of some small water-course, the topography becomes mildly hilly.

Referring now to the geological conditions, it may be pointed out that the entire country is underlaid with Niagara limestone having a thickness of 50 feet; underneath this is Clinton limestone with a thickness of about 16 feet; and below the Clinton is the Cincinnati group of limestones. The general slope of these rock could not be ascertained, but presumably they are level or slightly inclined toward the west. This latter opinion would seem to be borne out by the fact that numerous small springs outcrop from the rock on the east side of the valley of the Little Miami River. The rock for the most part is compact and is generally not considered a waterbearer. At any rate, no instance either in geological reports or at the time of the recent inspection could be obtained of wells with large yield that penetrate the rock.

Overlying the rock are drift deposits which while consisting mostly of clay, contain gravel and sand either separate in the form of pockets or intermixed with clay. The thickness of the drift varies considerably, though from inquiry it appears to range from 20 to 30 feet. At almost any point wells may be sunk in the drift deposits and obtain a sufficient quantity of water to supply an ordinary farm house. The water held within the drift, however, is entirely dependent upon local rainfall conditions, and the level of ground water varies greatly from season to season. At the time of the recent inspection, many of the wells were found full almost to overflowing; while it was generally stated that during dry periods in the summer time, the water recedes to 20 feet or more below the surface. It seems that as a rule the wells never go dry, though here and there instances were found of wells that fail in unusually dry seasons.

At Ft. Ancient itself, the conditions with respect to water obtainable in the drift are not so favorable as in the country to the eastward owing to the topographical peculiarities already described. It will be recalled that the fort is nearly cut off from the table-land to the eastward by ravines, and this prevents the passage of water from the neighboring drift into the drift which is found at the fort. It is not surprising therefore that the shallow well at the home of the caretaker will just meet the needs of perhaps one family; in very dry seasons this well may fail entirely.

Having reviewed the topographical and geological conditions, the direct problem of how to obtain a water supply may be taken up. It will be well to consider first the needs of the two days' encampment at the fort. It is estimated that there should be available a minimum of 30,000 gallons per twenty-four hours. There are three possible sources from which this quantity of water may be obtained: first, springs outcropping from the rock on the hillsides below the fort; second, drilled wells, pene-

trating the rock; and third, wells penetrating sand and gravel deposits occupying the old glacial valley of the Little Miami River.

As already pointed out, numerous small springs outcrop from the rock strata on the east side of the river valley. On the slopes below Ft. Ancient there are perhaps a dozen of these springs. None of them have been properly developed, but from what could be observed they are all of very small flow and any scheme to utilize them as a source of water supply would involve rather extensive works for improving the flow and for combining their yields. Again, the location of most of the springs is very inaccessible so that unusual difficulties would be encountered in the construction and maintenance of such a supply. There is also an objection to the springs on sanitary grounds; namely, the watershed immediately above them might become contaminated during the presence of the soldiers at the fort and thereby influence the quality of the water. In other words, immediately above the point of outcrop of the springs there is not a sufficient covering to insure adequate protection.

Next in order are drilled wells penetrating the rock and located within the fort. One such well has already been sunk but failed to secure a large supply of water. On the other hand, some encouragement is given to the thought that water may be secured in the rock by the presence of the numerous springs above referred to. In all probability the water passes through the rock in the form of streams within channels formed by the solvent action of the water on limestone rather than in a broad sheet such as is generally found in waterbearing strata within the drift deposits or between strata of certain kinds of rock. If therefore a number of wells could be sunk within the fort that would strike a good stream of water, they would constitute a comparatively cheap and always available source of supply.

The third mentioned available source of supply, namely, wells sunk in the sand and gravel deposits occupying the bottom lands of the Little Miami River, would in all likelihood be absolutely dependable, but the development of such wells would involve the construction of a pumping station, reservoir, and distribution system. The installation of such a supply seems on the whole a rather elaborate undertaking for so temporary a camp, yet it may be constructed at comparatively small cost and in a manner that will render it a permanent asset to the fort should it be decided to hold encampments in this vicinity in future years.

Summarizing the relative merits of the three possible sources of water supply for the Ft. Ancient encampment, it would appear on the whole best to disregard the springs owing to the likelihood of their becoming contaminated and also because of the difficulties that would be encountered in their development. The simplest, perhaps the cheapest, and on the whole most satisfactory source of supply would be that obtainable from drilled wells provided the water is encountered in sufficient quantities. It is estimated that perhaps ten wells properly distributed

would meet all the needs of the encampment as far as convenience is concerned. It is deemed highly advisable to test the availability of water from drilled wells by having at least three test wells sunk in various parts of the fort. If these wells prove entirely satisfactory, additional wells may be drilled. Should an attempt to secure water from deep wells meet with failure, recourse must be had to wells in the valley of the Little Miami River. The development of such wells would necessitate, as already pointed out, the installation of a regular water works system. The pumping station may include a power pump driven by a gasoline engine. It is not believed necessary for so short an encampment to install the machinery in duplicate; however, some precaution against breakdown should be provided in the form of a storage reservoir located within the fort and having a capacity of about 20,000 gallons. A force main leading from the pumping station to the tank must be laid, and about two miles of distributing system would be required to convey the water to the various parts of the fort. No reliable estimates of the cost of such an installation have been made but the cost should not exceed \$5,000.

Having reviewed the conditions governing the development of a water supply at Ft. Ancient in the light of information at present available, attention may now be directed to the availability of suitable water supplies while the soldiers are engaged in field maneuvers. As already indicated, practically all of the wells in the surrounding country are shallow dug wells which derive their supply from the lower layers of the drift deposits. As is generally the case with shallow dug wells, these are rarely adequately protected from surface contamination. In many cases wells were found in such locations and constructed in such manner as to cause them to receive directly surface drainage. The covering of the wells usually consists of loosely laid boards which readily permit various sorts of dirt tracked by chickens, animals, and human beings, to fall into the well. Again it is questionable whether many of the wells will yield a sufficient quantity of water to supply the soldiers during even temporary encampment. On the other hand, it may be pointed out that notwithstanding the generally unfavorable construction of many of these wells, they are not likely to gross contamination and at small cost could be rendered practically safe against surface wash. None of these, however, would be satisfactory as a source of supply in a camp of any permanence for the reason that rapid contamination of the soil incident to camp life would almost surely find its way into the wells. The brief period of the recent inspection did not permit the examination of all of the wells within the area proposed for maneuver purposes, and it is therefore very difficult with the present available information to reach any definite conclusions as to whether the wells will or will not furnish the soldiers with a suitable supply of water during the time they are in the field. However, it is the purpose of the engineering department of

the State Board of Health within the course of several weeks to obtain a complete description of every well within the maneuver area and to collect samples for complete sanitary analysis from such wells as seem to be subject to contamination. With this information it will be possible to prepare a map for the officers in command, showing the location of all wells together with a statement as to the suitability of each for use by the soldiers. Such wells as prove to be dangerous may then be placarded in a manner that will prevent the soldiers from using them.

SUMMARY.

The foregoing may be summarized as follows:

Immediate arrangements should be made for drilling several test wells into the rock at the site of Ft. Ancient. On completion of these wells they should be subjected to a pumping test in the presence of a representative of the engineering department of the State Board of Health. Should these test wells give indications of the impracticability of deriving an adequate supply of water in this manner, plans should be prepared for the development of wells located in the valley of the Little Miami River.

During the progress of these investigations, a thorough examination will be made of all of the farm wells located within the territory proposed for maneuver purposes with a view to obtaining such information as will determine the suitability of these wells as sources of water supply for the soldiers while in the field. This information will also serve to enable the officers in command to prevent the use of such wells as are liable to contamination, and will assist in selecting locations for temporary camps.

Copies of this report were sent to Adjutant-General Charles C. Weybrecht, Columbus; Gen. William V. McMaken, Toledo; Col. Edward S. Bryant, Bloomdale; and Col. Lloyd W. Howard, Toledo.

REPORT ON POLLUTION OF THE LITTLE MIAMI RIVER AT MILFORD.

Complaints were made by residents of Terrace Park with respect to the use for "sanitary purposes" of a 24-inch "storm water" sewer recently constructed at Milford. Investigation was made by Mr. John W. Hill, member, who reported as follows:

Milford is a village of 1500 to 1800 inhabitants, located in Clermont County, on the Little Miami River, about 13 miles from its mouth.

The banks of the Little Miami River, for several miles below Milford, are largely occupied by summer residents, and "campers" and the

pools formed in the stream, are used for bathing, swimming and boating, and the conditions are such that none of the villages on the river above Plainville, should be permitted to run untreated sewage into the stream.

Another objection to the use of the river at Milford for raw sewage flow, is found in the fact that the stream enters the Ohio River only a short distance below the new Cincinnati water works intake, so that the discharge of sewage into the Miami River by Milford, during a period of typhoid fever in the village, might result in infecting the Cincinnati water supply, and might be the cause of typhoid fever among people living lower down in the summer residences and camps on the river banks.

Of course the water supply of Cincinnati is now purified by mechanical filtration, and the danger of typhoid infection from the Little Miami, in the manner mentioned, is very remote, and hinges on the possible careless operation of the city filters at such time, a condition scarcely likely under present management, but which is altogether possible in years to come.

The "storm water" sewer authorized by the State Board of Health, August, 1907, is 1,115 feet long and 24 inches in diameter; and runs from a point in Locust Street mid-way between Main and Water streets, 64 feet to Water Street, thence 355 feet to Elm Street, thence diagonally across Elm Street, 144 feet to Polk Street and thence at a small angle to the center line of Polk Street, a distance of 550 feet to a man-hole, from which it is turned at an angle of about 120 degrees into the Little Miami River. At each change of direction, a substantial man-hole, is located in the line of the sewer. The sewer enters the river through an ordinary out-fall and there is no provision for interception of any matter which may find its way into the sewer before it enters the river. At the head of the sewer, a 12-inch branch has been located in the alley running north and south, midway between Main and Water streets, and it is stated that the purpose of this sewer was for connection with the property fronting on Main Street and other property fronting on Water Street, although after the construction of the branch sewer your committee is informed the village council prohibited house connections with it.

At its head, the new sewer connects with an old stone "storm water" sewer, which drains the territory in the neighborhood of Main and Locust streets, the old sewer formerly discharging into a cesspool or cistern in Locust Street, which when full would overflow and discharge the surplus through the open gutters by the nearest route to the Miami River. The old cesspool, has been filled and all drainage collected by the old "storm water" sewer, is now discharged into the new 24-inch vitrified pipe sewer, and thence into the river.

Upon conference with the village engineer, Mr. G. H. Hill, who made the plans and supervised the construction of the sewer, it was

learned that the sewer was built for "storm water" purposes only, and such gutter wash as might reach it under ordinary conditions and during storms. At the time of the committee's visit, July 26th, investigation revealed the fact that the sewer is now actually receiving domestic sewage, including probably, the discharge from one or more water-closets and while the volume of flow is small, the discharge, such as it is, is run into the Little Miami without treatment.

The use of the sewer for sanitary purposes, is in violation of the permit granted by the State Board of Health, August, 1907, and should be discontinued, excepting the village authorities are prepared to promptly apply some satisfactory method of sewage treatment at least during the months of low stream flow and during the months when the residences and camps on the banks of the river are occupied.

Your committee can see no possible danger from the discharge of untreated sewage from Milford into the Little Miami River when the Miami River and the Ohio River, are at good stage, but there is danger in discharging sewage into the river when the Ohio is at a low stage and at low stream flow. Of course the low stage and small stream flow, will occur during the late summer months in both streams and it is at this time when the discharge of raw sewage into the Little Miami will be a menace not only to the residents and "campers" on the banks of the stream below Milford, but should the event mentioned herein occur, then also to the people of Cincinnati, and if a sewage disposal works is adopted by the village, a rule should issue from the State Board of Health, to maintain this in operating condition, from the 1st of May to the 1st of November, and longer, each year, if experience demonstrates the necessity.

Upon conference with Mr. Cook, President of the Milford National Bank it was found that it is the intention to run an additional sewer from Main Street, through Garfield Avenue, to the 24-inch "storm water" sewer, and to discharge into this the sewage collected from the Bank building, which contains a store or two and 4 flat suites, and that the parties contemplating this connection were disposed to ignore the permit of the State Board of Health, August, 1907, which provides that this sewer shall be constructed and used for "storm water" purposes only; however, Mr. Cook, the principal party, who wishes to make a sanitary connection with the "storm water" sewer, promised to defer his work until such time as might be required to collect the data with reference to the construction of the sewer, and submit this report to the State Board of Health.

At a meeting of the State Board of Health held October 19th, 1910, a large delegation, some forty in number, mostly citizens of Cincinnati including the health officer and the health officer of Terrace Park appeared before the Board and urged that the village of Milford be restrained from polluting the Little Miami River. The authorities of Mil-

ford had been notified that the matter would come before the Board at this meeting, but no representative from the village was present.

The report of Mr. Hill was considered, and after a full discussion of the situation the Board voted "that the village of Milford be prohibited from using this storm sewer for the purpose of carrying household wastes or other putrescible matter to the Little Miami River unless properly purified."

The mayor and council of the village were notified of the action taken and were informed the Board would expect that its order be complied with.

REPORT ON THE POLLUTION OF MILL CREEK.

At a meeting of the State Board of Health held April 20th, 1910, a delegation from the village of Carthage appeared and asked the Board's permission to install a system of sanitary sewers with an outfall into Mill Creek within the village limits, and to hold in abeyance the previous order of the State Board of Health requiring the village to install disposal works for treatment of the sewage before it is discharged into Mill Creek.

This question, together with the whole problem of the policy that should be adopted by the Board in reference to the pollution of Mill Creek was referred to Mr. John W. Hill, member, as a special committee of one to report to the Board with his recommendations.

At the June meeting of the Board Mr. Hill presented the following report:

Mill Creek is a stream with a general course northeast and southwest, which drains a part of Butler County, all the east central part of Hamilton County, and a very small portion of Warren County, and enters the Ohio River within the westerly limits of Cincinnati. The fairest part of the urban and suburban districts of Cincinnati and the principal villages, public, eleemosynary and corrective institutions of the city and county, and the larger manufacturing interests in and adjacent to the city, are located on its watershed.

The drainage area is about 170 square miles, and the main stem of the creek may be said to reach from the Ohio River to the village of Lockland, a distance along meanders of 13.6 miles, from which point the west branch reaches to the central western district of the watershed in Hamilton County, the middle branch reaches into the central part of Butler County, four miles east of Hamilton, and the east branch into the south-east part of Butler County. Several small streams, principal of which is Bloody Run, bring the drainage from the easterly part of the watershed to the main stream, south of the confluence of the three branches at and near Lockland.

The main stream has an average channel slope of 8 feet to the mile.

The west branch 13.8 miles long on its meanders, has an average slope of 26 feet to the mile.

The middle branch 14.6 miles long on its meanders has an average channel slope of 17.8 feet per mile.

The east branch 11.04 miles long on its meanders, has an average channel slope of 32.61 feet per mile.

The slopes of the forks of the stream, it will be seen are rather steep, and the runoff on the watershed, north, east and west of Lockland, is very rapidly delivered to the main stream, so that any considerable rainfall over the watershed usually cleans out the main channel of all stranded matter and carries it into the Ohio River.

There is always a flow in Mill Creek from springs that are perennial, although varying in volume with the rainfall, and the flow at the highest present sewerage station (Wyoming), is at the lowest stage of the stream many times the prospective sewage flow from that village. Below Wyoming, or rather below Lockland and Hartwell, accessions to the stream flow come from two aqueducts which carry the Miami and Erie Canal over the creek, as well as from numerous springs which feed the stream; and by request of this Board to the State Board of Public Works, your committee has no doubt that arrangements can be made whereby the whole flow of the canal from midnight of Saturday to midnight of Sunday can be diverted into Mill Creek at Lockland, and in this manner secure a large flow of reasonably fresh water for a period of 24 hours each week. This has been done heretofore upon request of the village of Hartwell, but not in a systematic manner. If, however, a formal statement of the case is made to the State Board of Public Works showing the advantage that will follow the discharge of the flow of the canal into the creek at Lockland, rather than as at present over the spillway at Spring Grove and through the Eggleston Ave. sewer within the city limits. Your committee thinks that the change will be made, and the inspector in charge of the Cincinnati division of the canal be given orders to throw the entire flow into the creek regularly each week between the hours mentioned, and this water added to the natural stream flow will highly dilute the sewage flowing into the creek and be an effectual protection against the stranding of solid matter from sewage above Ivorydale or above Mitchell Avenue.

The least objectionable waste matter now going into Mill Creek is the small flow of sewage from the villages, and no reasonable complaint can be made to this excepting by the city of Cincinnati, and as the city is the only corporation that can be affected by it, and is itself the chief offender in the large and unrestricted use of the creek as a sewage carrier, it seems to your committee that nothing substantial is gained in requiring the little villages to purify their sewage, the effect of which is

wholly lost directly the stream passes the northerly boundary line of the city.

Assuming, however, that the city was not using the creek as a carrier of nearly 50 percent. of its sewage, even in that case the chief offenders would be the manufacturing establishments and corrective, charitable and religious institutions, which are now and for many years have been using the stream as a point of outfall for their sewage, and purification of the village sewage will accomplish no real benefit to the waters of the stream, if the other offenders are left unchecked in their use of the stream as a carrier of raw sewage.

In the summary of a report by the assistant engineer on the discharge of sewage into Mill Creek, by various institutions located near the village of Carthage, he says:

"The result of this inspection shows that Mill Creek receives sewage in the vicinity of Carthage from four institutions, the aggregate flow being at least 110,000 gallons. This flow is greater than would be produced by the village of Carthage for several years. The three outlets are all above the point of outlet of the sewage purification plant proposed for Carthage."

If, in the opinion of the Board, it is desirable to require all the villages sewerage into the stream to purify their sewage now then the order should be broadened to include the two infirmaries, the insane asylum, the religious houses and factories, including in the order, such local treatment of factory wastes as may be necessary to render the effluents equal in quality to the water of natural stream flow.

It is desirable that a broad improvement of Mill Creek for esthetic and economic reasons soon be made, in the interest of the county and city, and when it is made, the collection and treatment of all sewage and other wastes will become necessary in order that the creek may be a clean stream from headwaters to its mouth, and as suggested at another place in this report, when this is done, the collection and disposal works necessary for the city sewage should be enlarged in plan to care for all other sewage from the Mill Creek valley. Pro-rating the cost of works and operation between the city, the villages and public and private institutions served.

One objection to the small separate sewage disposal works adopted by the villages and public and private institutions on the watershed of Mill Creek, is the difficulty in having these properly cared for and operated from day to day. It is well known that sewage disposal works as well as works for the filtration of water must be intelligently operated in order to secure satisfactory results, and as a rule at least for the present and some years to come, intelligent and satisfactory operation cannot be had excepting in works built by the larger cities where it is possible to employ the talent and experience necessary to secure the highest efficiency and satisfy most exacting conditions of sanitation in the effluent sent into the outfall streams.

The villages on the watershed of Mill Creek are really additions in point of contiguity and population to the city of Cincinnati, only a highway divides the city from the village of St. Bernard, and another highway divides St. Bernard from the village of Elmwood. The villages of Elmwood and Carthage actually merge. A narrow strip of undeveloped territory separates Carthage from Hartwell. Hartwell and Wyoming also are villages that merge. The right of way of the C. H. & D. railway track separates Wyoming from Lockland. The east fork of Mill Creek separates Lockland from Reading, and a strip of farm land less than two miles wide, separates Wyoming from Glendale, which is the most northerly village in the county lying on the watershed of the creek. About two miles east of Glendale lies the village of Sharon, and so it is clear that each one of the several little corporations not now a part of the city which contributes or may contribute sewage to Mill Creek is geographically a part of the city, and from the constant effort that is being made by some of the civic bodies of Cincinnati to force annexation of the villages to the city, it is altogether possible that within a few years all of the villages on the watershed of the creek, excepting perhaps Glendale and Sharon will be a part of the city, and subject to the charges, and open to the benefits of any public improvement which the city may engage in. Whether the delivery of sewage of the city into the Ohio River between the Fernbank (U. S. Government) Dam, and the intake of the new city water works, will have any influence on the quality of the water, public sentiment will compel the city to stop the pollution of its own water supply. Your committee does not think it will be necessary to show that this pollution is or may be inimical to health. It will be sufficient to show the people that pollution is going on, and that as a matter of civic pride, steps must be taken to stop it and dispose of the city wastes so far as these are received into the sewers, in some other manner.

The only municipality whose water supply could possibly be affected by sewage flowing in Mill Creek is the city of Cincinnati, and by far the large percentage of sewage entering the creek comes from the city itself, and if it be held that the sewage of the Mill Creek valley should be purified to guard against any possible or fancied injury to the water supply of Cincinnati, what shall be said with respect to the sewage now delivered into the pool above the Fernbank Dam (from the upper end of which the city takes its water supply), with respect to the sewage now flowing into the river from the towns on the Kentucky side, over which neither this Board nor the city of Cincinnati has any jurisdiction.

Of course one evil does not justify another, and it would be no argument to say that the river should be polluted with the sewage of Mill Creek ten miles below the point of intake because it happened to be polluted by sewage from other points not subject to the laws of the State of Ohio or the ordinances of the city of Cincinnati, but it is clear that

if the waters of Mill Creek were even today of the purest quality, this would have no influence whatever on the sewage pollution of the river from the Kentucky side which begins just below the point of intake, that is to say the sewage from Ft. Thomas, a large suburb on the Kentucky side of the river discharges its sewage into the river about one mile below the Cincinnati intake, to which is added in order the sewage from the Kentucky Highlands, Dayton, Bellevue, Newport, Covington, Ludlow and Bromley, with an aggregate population of over 100,000, so that any steps which may be taken to protect the river water in the Fernbank pool from sewage pollution, to be effective, must be by joint action on the part of this state and the state of Kentucky.

When this is done, the proper plan will be to run up the valley of Mill Creek, an intercepting sewer proportioned to take the sewage of all the villages as far north as Glendale with branches to Lockland and Reading, and adapted to the natural growth of the territory for fifty years to come, and bring this sewage down to a point where it will be received into the intercepting sewer that will traverse the valley of Mill Creek to the north corporation line. It seems to your committee, whether the villages are annexed to the city or not, a scheme to provide for the collection of all the sewage flowing into the creek and delivery and treatment at one point is bound to be carried out in the near future, as an economic and sanitary proposition.

The village of Wyoming has had for more than a year, a sewage disposal works, but it is said no sewage has ever been delivered into it, and the reason for this is said to be that there is not enough sewage flowing from the outfall sewers to justify putting it on the filter beds, or rather it is insufficient in volume to enable the filters to work properly. Here is a case of a relatively large investment in the purification works and no use made of it up to the present time, and no prospect of its being put in service in the near future. When it is put in service (knowing the character of the employees of the village who are expected to look after work of this character), it is not probable that the filters will be given the attention and skilled management necessary for their successful operation from day to day.

If it was probable that the city of Cincinnati would not at any distant date take steps to collect and purify its sewage now flowing into Mill Creek and thence into the Ohio river, or if there was any use or prospective use, other than for irrigation purposes of the water flowing into the channel of Mill Creek, then it would be necessary to provide separate stations or a collective sewage disposal station for all the villages, institutions and factories on the watershed of the stream, and if conditions do or should warrant the treatment of sewage from the villages before it is allowed to enter the creek, the geographical and physical conditions suggest that it can be better done by collecting at one point the sewage of Glendale, Wyoming, Lockland, Arlington Heights, Read-

ing, Hartwell, Carthage, Elmwood and St. Bernard, and an intercepting or collecting sewer laid for the accommodation of these villages would also serve the village of Sharon when it is sewered, and could be made to serve the city of Norwood for that portion of its sewage discharged into Bloody Run.

The engineering features of the work are not difficult, and with the "Shone" air lift or an equivalent device, all low grade outfall sewers, if there be such, can be successfully connected with the main collecting sewer, which will carry sewage to a single disposal station, and such station would then be of such magnitude and serve so large a combined community, as to justify the employment of proper skill and labor to successfully manage and operate it.

It is however not likely that the city of Cincinnati will much longer delay action with respect to the collection and disposal of its sewage, especially that portion now flowing into Mill Creek, and the diking of the stream as far north as Lockland, and creation of a self-cleansing channel, will soon be forced on the city and owners of land north of the city, in order to make available for commercial purposes hundreds of acres of land which by the periodical overflow from the unrestricted creek channel and from flood waters backing up into the creek from the Ohio River, is now practically waste land or truck farms.

If all the villages on the watershed of Mill Creek were sewered, and all the sewage treated by the most approved methods before the effluent was permitted to enter the stream, and no steps were taken by the city to collect and treat its own sewage flowing into the creek or to require the treatment of the great volume of factory wastes now running into the creek, it is doubtful if analyses would show any considerable improvement of the water in the creek at Mitchel Avenue bridge, and points down stream from Mitchel Avenue so that the purification of the village sewage would satisfy no esthetic or sanitary condition of the water flowing into Mill Creek or of the creek channel, after it passed south of the northern boundary line of the city.

Certain operations are best conducted on a large scale, thus iron is melted and cast with more economy and better mechanical results in a large foundry than in the laboratory; soap is a much better product from operations on a large scale than when made in a small way on the farm or in the laboratory; the manufacture of steel rails and bars is more satisfactorily conducted in the large mills than in small establishments, your committee believes that the treatment of sewage by processes calculated to render it innocuous and inoffensive, will always be better accomplished when dealt with in large volumes under trained management, than when collected in small volumes and handled by indifferent labor and skill.

The larger operations in any line can afford to pay for and must engage the best talent and most experienced labor for the conduct of its

work. They must devise the most efficient systems for the rapid and certain performance of their operations and for the evolution of their products. The fixed charges on their plants must be kept low, while the quality and quantity of product must be kept high, and the same condition applies to the construction of works and treatment of sewage. The large works should and will give the most satisfactory results while the little works, operated in a piddling manner by unintelligent and low priced labor, may wholly fail to satisfy sanitary conditions, and in due time become a nuisance instead of a benefit to the community served.

There are of course, many instances where this reasoning will not apply, because with such, if sewage purification is to be attempted at all, it must be of necessity conducted on a small scale, and in such cases after adopting the best methods and employing the best skill obtainable in operation of the works, we must be satisfied with the results that follow.

Returning to the subject of this report, it seems manifestly unfair to compel the little villages to construct and operate small disposal works, to purify sewage, while the stream into which the effluent flows is naturally as bad as the raw sewage from the villages. To accomplish anything with respect to a stream like Mill Creek, every factory and every public and religious institution as well as the city of Cincinnati and the villages should be required to so deal with its sewage and liquid wastes in such a manner as to furnish an effluent which shall be no worse than the runoff of rainfall from farm lands, on the watershed of the creek before it is permitted to flow into the stream; and aside from the local treatment of factory wastes, the sewage from the city of Cincinnati, the factories, the institutions and the villages can best drain to one place, and the sewage then be treated and purified before it is turned into the creek or into the Ohio River.

If an adequate collecting sewer be laid to serve all the villages, connected at its lower end with a similar collecting sewer for the western part of Cincinnati and the city sewer be proportionally increased in size to accommodate the flow of sewage from the combined villages and other sources of sewage, and the sewage disposal works of the city be proportionally increased in size and capacity to care for the additional run of sewage from the villages and other sources, the pro-rated cost of works to the villages will be very much less than if each of these be required to construct its own sewage disposal works, and the cost of operation will be very much lower and be more efficient and satisfactory from a sanitary point of view.

In view of the prevailing conditions with respect to the creek as a carrier of sewage and other wastes; of the non-use of the water for any purpose, excepting possibly its occasional use by truck farmers for irrigation, and for tempering clay in brickyards, and the imminent prospect of the city of Cincinnati soon engaging in a large works for the collec-

tion and disposal of all its sewage, your committee believes it would be wise to not insist on the construction of the small disposal works by the village of Carthage and other villages at the present time, but to encourage that village and the other villages to construct adequate systems of sewers and for the present use Mill Creek as a carrier of the effluent until such time as the city of Cincinnati inaugurates a sewage disposal works and recommend that when this is done that such works be planned to care for all the sewage from the villages, factories and institutions on the watershed of Mill Creek as well as the sewage furnished from the western part of the city. Such legislation, if any be needed for the co-operation of the villages, the city of Cincinnati and the county in a joint work of this nature, to be recommended to the legislature at the proper time.

Subsequent to writing this report a copy of the report of the acting chief engineer on the statistics of the Mill Creek Valley with respect to villages, institutions, manufacturing establishments and population, and the character of the pollution of the stream was received. The report shows that Mill Creek before it reaches the villages is grossly polluted by manufacturing wastes, and that it is not possible for the village sewage to make the waters of the stream worse. We find it is and has been an open sewer and a nuisance for many years, and it is a subject requiring broad treatment in order that the work of sanitary improvement may be effective. It is not possible by purifying the sewage of all the villages to make any marked impression on the waters of the creek, or its channel.

At the meeting of the State Board of Health held June 30th this report, with its recommendations, was adopted. The authorities of Carthage and Elmwood Place were notified of the present attitude of the Board as regards sewage disposal for these villages.

REPORT OF LABORATORY WORK

For Year Ending December 31st, 1910.

REPORT OF LABORATORIES.

I have the honor to present the following report for the year ending December 31st, 1910.

During the present year the laboratory has been enlarged considerably and now occupies the entire upper floor of the State House annex. The State Medical and State Pharmacy Board offices were removed to another part of the building and the rooms left vacant by this change were occupied by the laboratory. The office of the former board was fitted up as a diagnostic laboratory and outfit room, and that of the latter as the general office of the laboratory. This arrangement separated the infectious disease and water bacteriological work and furnished additional space for the chemical laboratory and media preparation.

While the crowded conditions of the laboratory are much relieved the ventilating and lighting accommodations are still very poor and the latter especially interferes with the microscopical and chemical work.

OUTFITS.

For Diphtheria.

A change was made early in the year in the form of diphtheria outfit. The form containing blood serum was found to be somewhat unsatisfactory since in a number of the stations the outfits were often kept for a considerable length of time before being used and the serum became contaminated or dried. Specimens were also much damaged by rough handling in the mails. The change to the present form which consists of two sterile swabs in a test tube, was made without any additional expenditure and the postage was reduced from eight to six cents.

For Malaria.

During August of this year malaria outfits were prepared and distributed to the different outfit stations. While the number of specimens submitted for malaria diagnosis is relatively few and probably will not increase greatly, the outfits have proven valuable in these few cases and they are also convenient for mailing smears for various other examinations to the laboratory.

For Ophthalmia Neonatorum.

After investigating the various outfits on the market and in use by State Boards of Health for the distribution and use of silver nitrate solution for the prevention of ophthalmia neonatorum a suitable form of outfit was devised and, after favorable action by the Board on the ex-

penditure of the necessary funds, about twenty thousand of these outfits were made up and an effort made to place them in the hands of every registered physician and midwife in the state. A supply was also placed in the regular outfit stations to furnish future supplies for physicians.

NEW APPARATUS AND EQUIPMENT.

Sputum Shaker.

During March of the present year a sputum shaking machine was added to the equipment of the laboratory. By the use of this machine not only is the ease and speed of examination increased but experience has shown that there is an increase in accuracy as well, as all caseous particles, coagulated masses and mucus are thoroughly broken up and the specimen rendered homogeneous. Any tubercle bacilli are thus distributed throughout the specimen and the likelihood of finding them when few in number is greatly increased.

During the year considerable work was done in the way of digesting sputum with mucus solvent and comparative tests show that there is some advantage in the process.

Crematory.

A twenty-four inch crematory was installed in one of the light wells during the year and has proven a very valuable addition to the laboratory. Prior to the purchase of this all rabies material as well as many other infectious materials had to be taken to the State House basement and then hauled away by the city garbage disposal department. This was not only inconvenient but oftentimes unsafe. At present all infectious and other combustible refuse from the laboratory is destroyed in the crematory.

Refrigerators.

Two new refrigerators were purchased during the year to replace the smaller ones in the laboratory. These additions make it possible to store sufficient quantities of media to always supply the demand both for field and laboratory work, and also afford separate storage space for infectious material, and while the combined storage capacity of these two refrigerators is about twice that of the old ones the cost of icing the former is much less.

Incubators.

A 20°C incubator was installed in the water bacteriological laboratory for use in estimating the number of bacteria in water. The apparatus is necessary in order that results obtained may be comparable with those of other laboratories. Although considerable difficulty is usually encountered in keeping a constant 20° temperature, this incubator has done excellent work and with a small cost of operation.

A new 37°C incubator was purchased late in the year to be installed in the diagnostic laboratory.

SUMMARY OF EXAMINATIONS.

The total number of examinations for the year was 4665, an increase over the total for 1909 of 80, and was divided as follows:

Bacterial diagnosis (including rabies).....	3,229
Sanitary water analyses.....	1,036
Sewage and trade wastes.....	247
Special examinations	247
	<hr/> 4,665

Date	Diphtheria.	Tuberculosis.	Typhoid.	Malaria.	Rabies.	Miscellaneous.	Water.	Sewage	Total.
Jan.	24	138	37	.....	5	0	46	1	251
Feb.	30	144	35	.....	7	0	72	2	290
Mar.	30	204	42	.....	25	15	60	11	387
April	28	192	39	.....	12	4	62	0	337
May	18	160	36	.....	17	47	65	30	373
June	17	172	51	.....	16	26	92	68	442
July	19	162	73	.....	8	66	100	8	436
Aug.	26	171	115	1	4	13	115	9	448
Sept.	30	167	118	4	2	24	150	2	504
Oct.	47	143	113	3	8	32	126	7	479
Nov.	55	132	75	4	13	19	94	7	399
Dec.	37	160	47	0	12	1	54	8	319
	<hr/> 355	<hr/> 1,945	<hr/> 781	<hr/> 12	<hr/> 136	<hr/> 247	<hr/> 1,036	<hr/> 153	<hr/> 4,665

DIPHTHERIA.

TABLE SHOWING NUMBER OF EXAMINATIONS CLASSIFIED.

	Positive	Negative	Atypical	Unsatisfactory	Total
January	14	9	0	1	24
February	15	15	0	0	30
March	9	20	0	1	30
April	7	20	0	1	28
May	7	9	1	1	18
June	3	13	0	1	17
July	7	11	1	0	19
August	4	15	1	0	20
September	7	20	0	3	30
October	12	34	0	1	47

DIPHTHERIA — Concluded.

	Positive	Negative	Atypical	Unsatisfactory	Total
November	28	26	0	1	55
December	10	23	1	3	37
Total	123	215	4	13	356

The total number of diphtheria examinations has decreased by 38 over the total of 1909. In that year, however, there were 35 special cultures from the Children's Home at Zanesville, so that the actual decrease in routine examinations is only 3. The total percentage of positives has increased from 32% in 1909 to 36% in 1910.

TUBERCULOSIS.

TABLE SHOWING MONTHLY EXAMINATIONS CLASSIFIED.

	Positive	Negative	*Unsatisfactory	Total
January	48	90	0	138
February	33	110	1	144
March	56	146	1	204
April	45	146	1	192
May	52	106	2	160
June	58	114	0	172
July	61	101	0	162
August	66	105	0	171
September	62	104	1	167
October	37	106	0	143
November	41	90	1	132
December	58	101	1	160
Total	617	1,319	9	1,945

The total number of examinations for 1910 shows an increase over 1909 of 511, or almost 36%. With this increase in the number of specimens submitted there has also been an increase of 1% in the percentage positive, it being 31% this year.

With the increased facilities for obtaining outfits the physicians are submitting specimens on slighter clinical evidence.

*Insufficient sputum for examination.

TYPHOID.

TABLE SHOWING NUMBER OF MONTHLY EXAMINATIONS CLASSIFIED.

	Positive	Negative	Atypical	Unsatisfactory	Total
January	23	11	1	2	37
February	25	9	1	0	35
March	23	18	0	1	42
April	20	18	0	1	39
May	20	14	0	2	36
June	25	23	1	2	51
July	21	49	2	1	73
August	50	57	4	4	115
September	53	63	1	1	118
October	55	57	1	0	113
November	44	30	1	0	75
December	19	28	0	0	47
Total	378	377	12	14	781

The total number of Widal examinations in 1910 shows an increase of 122 over that of 1909. The percentage positive, however, has decreased from 61% in 1909 to 49% in 1910. This decrease in positives is no doubt due largely to the absence of any severe epidemics such as occurred in 1909.

RABIES.

TABLE SHOWING NUMBER OF MONTHLY EXAMINATIONS CLASSIFIED.

	Positive	Negative	Unsatisfactory	Total
January	4	1	0	5
February	5	1	1	7
March	17	5	3	25
April	9	2	1	12
May	10	6	1	17
June	8	7	1	16
July	6	2	0	8
August	3	1	0	4
September	5	3	1	9
October	4	1	.....	8
November	8	5	.....	13
December	10	1	1	12
Total	89	38	9	136

The total number of examinations in 1910 has decreased from those in 1909 by 7. This is due in part to the fact that the city board of health of Columbus has examined all cases in the city since the first of the year. The percentage positive has increased from 57% in 1909 to 65% in 1910. Of the 35 animal inoculations in negative microscopical findings only one developed rabies. This was a case in which the material was much delayed in reaching the laboratory.

During the present year a circular to the express companies stating the conditions under which the heads of animals should be accepted for shipment has resulted in the heads being received in much better condition in the great majority of cases. There is still need of some means of informing physicians generally in this regard as much material is submitted in an unsafe and improper manner.

MALARIA.

	Positive	Negative	Total
August	1	0	1
September	1	3	4
October	0	3	3
November	0	4	4
December	0	0	0
Total	2	10	12

Outfits for these specimens were distributed in August.

MISCELLANEOUS.

January	0	August	13
February	0	September	24
March	15	October	32
April	4	November	19
May	47	December	1
June	26		
July	66		
			247

The above table includes all special tests as follows:

- 131 samples water for B. coli only.
- 36 samples water for number bacteria.
- 3 specimens for glanders (from suspected human case).
- 1 specimen for diphtheria bacilli on toys.
- 1 sample water for lead.
- 1 sample water for suspected poison.
- 9 samples water for chlorine content.

- 2 specimens feces for eggs of parasite.
- 2 specimens from stool for tape worm.
- 1 specimen from stool for tuberculosis.
- 2 specimens pleural effusion for tuberculosis.
- 1 specimen from pleural cavity for tuberculosis.
- 1 swab for specific disease (syphilis).
- 1 specimen fluid from knee for organisms.
- 1 specimen vaginal smear for gonococci.
- 3 specimens pus from abscess for tuberculosis.
- 1 specimen pus from shoulder joint for tuberculosis.
- 3 swabs vaginal smear for diplococci of Neisser.
- 1 sample milk for organisms.
- 13 samples ice for coli.
- 2 samples catheterized urine for tuberculosis.
- 1 culture smear from spleen for organisms.
- 2 samples Columbus water for hardness.
- 2 samples Columbus water (filtered) for hardness.
- 3 specimens feces for bacillus typhosus.
- 1 specimen feces for bacillus tuberculosis.
- 1 specimen urine for tuberculosis.
- 1 specimen from testicle for tuberculosis.
- 1 specimen malignant growth for tuberculosis.
- 2 specimens from pleural cavity for tuberculosis.
- 1 specimen pus from abscess for tuberculosis.
- 1 sample water for mineral analysis.
- 1 specimen from throat for diphtheria bacilli.
- 1 vaginal smear for gonococci.
- 2 specimens pus for gonococci.
- 1 specimen pus for tubercle bacilli.
- 1 specimen pus for ophthalmia neonatorum.
- 2 samples water for gas.
- 1 specimen growth for algae.
- 1 specimen deposit for algae.
- 1 specimen feces for tubercle bacilli.
- 1 specimen deposit for silicious matter and iron.
- 1 sample water.

WATER ANALYSES.

MONTHLY EXAMINATIONS CLASSIFIED.

	Proposed Public Supplies	Present Public Supplies	Private Supplies	Samples from Columbus Tap	Total
January	0	17	12	17	46
February	0	30	18	24	72
March	12	9	13	26	60
April	5	15	20	22	62
May	13	15	14	23	65
June	21	14	37	20	92
July	8	12	60	20	100

WATER ANALYSES — Concluded.

	Proposed Public Sup- plies.	Present Pub- lic Supplies.	Private Sup- plies.	Samples from Columbus Tap.	Total.
August	21	10	66	18	115
September	23	32	75	20	150
October	9	37	80	0	126
November	4	13	65	12	94
December	0	9	36	9	54
Total	116	213	496	211	1,036
Decrease over 1909.....	19	209	*100	49	258

* Increase.

SEWAGE AND TRADE WASTES.

January	1	August	9
February	2	September	2
March	11	October	7
April	0	November	7
May	30	December	8
June	68		
July	8		
			153
		Decrease over 1909.....	263

WATER ANALYSES ON WATER SAMPLES FROM PRIVATE SOURCES.

CAUSE FOR EXAMINATION.

	Typhoid	Quality	Total
January	7	5	12
February	15	3	18
March	11	2	13
April	18	2	20
May	18	3	21
June	15	22	37
July	24	36	60
August	55	11	66
September	65	10	75
October	71	9	80
November	54	11	65
December	31	5	36
Total	384	119	503

The number of examinations because of typhoid in families using private supplies increased this year over last by 38, while number of examinations for quality increased 72.

RESULT OF ANALYSES OF SAMPLES OF WATER FROM PRIVATE SOURCES.

	Safe	Suspicious.	Polluted	Total
January	7	4	1	12
February	15	2	1	18
March	6	3	4	13
April	14	4	2	20
May	7	7	5	19
June	13	1	8	22
July	23	13	15	51
August	28	12	26	66
September	47	13	15	75
October	34	25	20	79
November	40	17	8	65
December	27	5	4	36
Total	261	106	109	489

The expenses of the laboratories during the year were :

Salaries	\$9,472 70
Apparatus and Supplies.....	3,062 55
Total	\$12,535 25

The laboratory was under the direct charge of Mr. B. R. Rickards up to December 31, 1910, and to him should be given all credit for the general management during the year.

Respectfully submitted,

FRED BERRY, *Acting Bacteriologist.*

CITY AND VILLAGE HEALTH OFFICERS

CORRECTED TO JUNE 1ST, 1911.

HEALTH OFFICERS IN CITIES AND VILLAGES.

Place.	Name.
Aberdeen	Dr. A. R. Carregan.
Ada	James F. Jamison.
*Adamsville	George W. McDowell.
*Addyston (Sekitan P. O.)	Noah Staton.
Adelphi	Jacob H. Karshner.
*Adena	John Huel.
*Agosta P. O. (New Bloomington)	L. E. Strawser.
Akron	Dr. A. A. Kohler.
Albany	Walker Neff.
*Alexandria	William H. Proctor.
*Alger	Sant Newland.
Alliance	Dr. W. H. Burns.
Alvordton	John L. Rutledge.
*Amelia	Dr. Homer C. Behymer.
Amanda	George Boerstler.
Amesville	J. C. Snedeker.
*Amherst	Dr. Washington Foster.
Amsterdam	T. J. James.
Andover	William Shipman.
*Anna	Dr. Edwin A. Steely.
*Ansonia	Dr. J. C. Poling.
*Antioch	Dr. D. W. Lowe.
*Antwerp	Samuel Boylan.
*Apple Creek	Harry H. Wilhelm.
*Arcadia	Joseph Boley.
Arcanum	Dr. W. B. Graham.
*Arlington Heights	William L. Goertemiller.
Arlington	Thomas B. Trovinger.
Archbold	August Ruibley.
Arnettville (Pitsburg P. O.)	Dr. J. O. Starr.
*Ashland	E. A. Kauffman.
*Ashley	Dennis G. Welch.
Ashtabula	Dr. J. J. Hogan.
Ashville	John Johnson.
*Athalia	C. M. Defoor.
Athens	Dr. J. M. Higgins.
*Attica	J. C. Work.
Avon	Dr. John R. Pipes.
*Bainbridge	Dr. W. W. Davis.
*Bairdstown	J. J. Baird.
Bakersville	
Baltic	Samuel P. Lower.
Baltimore	Noah B. Swartz.
*Barberton	Dr. George A. Brown.
Barnesville	J. W. Fowler.
Barnhill	Lewis Just.

* In lieu of a board of health.

Place.	Name.
Basil	T. F. Basch.
Batavia	Harry Dustin.
*Batesville	A. F. Dowden.
Bay (North Dover P. O.)	
Beach City	Theodore F. Stamm.
*Beallsville	Dr. W. S. Burcher.
*Beaver	G. W. Miller.
Beaver Dam	Dr. E. C. Yingling.
Bedford	Dr. W. H. Black.
Bellaire	Dr. D. W. Boone.
Bellbrook	John R. Whitacre.
*Belle Center	W. G. Oliphant.
Bellefontaine	Dr. A. J. McCracken.
Belleville	Dr. J. W. Kelly.
*Belle Valley	A. J. Thompson.
Bellevue	Dr. J. F. Miller.
Belmont	David Pangle.
Belmore	Dr. G. B. Adrian.
Beloit	R. H. Oswalt.
Belpre	Jesse McGrew.
Benton Ridge	Dr. R. D. Whisler.
Berea	Dr. A. A. Smith.
*Bergholz	Leeper Gordon.
*Berlin Heights	Dr. G. W. Hine.
*Berne P. O. (Carlisle)	W. R. Bromhall.
*Bettsville	Henry M. Craig.
*Bethel	G. A. Maxfield.
Beverly	Fred H. Hart.
Bexley	Frank P. Holtzman, Mayor.
*Blakeslee	Mathias Thiel.
*Blanchester	A. Titus.
Bloom Center	Dr. O. C. Wilson.
*Bloomdale	G. W. Urie.
Bloomfield (Bloomington P. O.)	
*Bloomingburg	H. W. Worrell.
Bloomington P. O. (Bloomfield)	E. R. Blackburn, Clerk.
Bloomville	Dr. D. W. Fellers.
Bluffton	Dr. R. E. Hughson.
*Bolivar	John C. Lab.
Boston (Owensville P. O.)	
*Botkins	Dr. Frederick R. McVay.
Bourneville	Alvin A. Loiry.
*Bowerston	Harrison Karn.
*Bowersville	J. E. Steward.
Bowling Green	W. E. Avery.
*Bradford	Dr. H. M. Forman.
*Bradner	A. Chronister.
*Bratenahl	Alexis J. Imhoff.
*Bremen	Dr. A. A. Bradford.
*Bridgeport	Louis R. Cook, Jr.
Brilliant	Frank Barcus.

* In lieu of a board of health.

Place.	Name.
*Brink Haven P. O. (Gann).....	J. S. Engelhart.
*Brooklyn Heights	Joseph E. Richardson, Cleve- land, R. D. No. 3.
*Brookside	Fred Elslager, Box 469, Bridgeport.
Brooksville	B. F. Shafer.
*Broughton	Eli Berrier.
Bryan	R. M. Rice.
*Buchtel	Ralph Ball.
Buckeye City	F. M. Welker.
Buckland	Dr. R. W. Sharp.
Bucyrus	Dr. A. H. McCrory.
Buffalo	Charley Frye.
*Burbank	A. W. Hoffman.
Burkettsville	Dr. E. L. A. Brown.
*Burton	Dr. A. D. Warner.
*Butler	John W. Long.
*Butlerville	Elias Smith.
*Byesville	D. Lewis Davis.
*Cadiz	Dr. William H. Lemmon.
Calais	O. S. Carpenter.
*Caldwell	W. L. Evans.
Caledonia	Noah Lee.
Cambridge	Dr. W. T. Ramsey.
*Camden	Dr. George W. Homsher.
*Canal Dover	H. H. Prince.
*Canal Fulton	John Ronan.
*Canal Winchester	Dr. J. W. Shook.
Canfield	Roscoe A. Brown.
Cannelsville (Dillon P. O.).....	
Canton	Dr. Frank DaHinden.
*Cardington	C. F. Axthelm.
*Carey	Joseph F. Wonder.
Carlisle (Berne P. O.).....	
Carroll	Dr. H. L. Bounds.
Carrollton	Dr. A. H. Hise.
*Carthage	Noah Babbs.
*Casstown	Dr. W. W. Baker.
Catawba	Forest Mahan.
*Cecil	Dr. F. F. Demuth.
Cedarville	Samuel Albright.
Celina	Dr. Joseph Sager.
Centerburg	Leo Dally.
*Centerville (Montgomery Co.).....	Lester Eagle.
Centerville (Gallia Co.) Thurman P. O.	
*Chagrin Falls	John W. Steever.
*Chambersburg (Eureka P. O.).....	Dr. W. J. Fletcher.
*Chardon	Rufus Smith.
*Chatfield	Samuel Lutz.
Chauncey	W. T. Sprague.

* In lieu of a board of health.

Place.	Name.
Chesapeake	
*Chesterhill	William Johnson.
*Chesterville	C. W. Mather.
*Cheviot	L. S. Getzendanner.
Chicago	Dr. A. R. Kauffman.
*Chickasaw	John P. Kroeger.
Chillicothe	Dr. W. S. Scott.
Cincinnati	Dr. J. H. Landis.
Circleville	Harry S. Sheets.
*Clarington	Dr. J. W. Parkhill.
*Clarksburg	Floyd Noble.
*Clarksville	Eli Gray.
Cleveland	Dr. Martin Friedrich.
*Cleveland Heights	Dr. Emil H. Stone.
*Cleves	Dr. Fred A. Grossman.
*Clifton	Dr. Frank C. Adams.
*Clinton (Fitchville P. O.)	
*Cloverdale	Dr. J. E. Stephan.
Clyde	Jesse Beard.
*Coal Grove	Dr. William Shattuck.
*Coalton	J. R. Maddox.
*Coldwater	Dr. F. H. Brumm.
*College Corner	Chris Haacke.
College Hill	J. E. Deininger.
Columbiana	Thomas J. Lyon.
Columbus	Dr. J. W. Clemmer.
*Columbus Grove	Dr. N. Seaman.
*Commercial Point	Joseph Conrod.
Congress	L. S. Simon.
Conneaut	Dr. R. J. Baxter.
*Continental	M. G. Pease.
Convoy	
*Colville	Dr. A. E. Lawrence.
Copley	
Corlett	Dr. Arthur M. Cheetham, Cleveland.
*Corning	William Anderson.
Cortland	Dr. B. G. McCurley.
*Corwin	Jacob J. Clark.
Coshocton	Dr. F. M. Marshall.
Covington	William E. Westfall.
Crestline	Dr. C. A. Marquart.
*Creston	Christian Schlegel.
Cridersville	J. M. Woodruff.
*Crooksville	Dr. John M. Denison.
*Croton P. O. (Hartford)	Dr. C. B. Hempstead.
*Crown City	Dr. E. M. Martindill.
*Cumberland	D. T. Phelps.
Curleyville	
*Custar	Dr. Ivan L. Biggs.
*Cuyahoga Falls	William W. Scupholm.

* In lieu of a board of health.

Place.	Name.
*Cynet	Dr. E. W. Missamore.
*Dalton	Dr. J. Coloman Haney.
Danville	Dr. T. E. Jefferson.
Darbyville (Orient R. D. No. 1)	
Dayton	Dr. C. L. Patterson.
*Deavertown	John H. James.
Deerfield (Portage Co.)	J. W. Taggart.
Deerfield (Warren Co.) South Lebanon P. O.	Dr. V. T. Reynolds.
Deersville	W. C. Birney.
Defiance	Dr. J. D. Westrick.
*De Graff	Thomas H. Makemson.
Delaware	Dr. A. J. Pounds.
*Dell Roy	Dr. S. B. Lechner.
*Delphos	Dr. Ezra Burnett.
Delta	George A. Everett.
Dennison	Ben Cable.
*Deshler	M. G. Coats.
*Dexter City	J. A. Bower.
*Dillon P. O. (Connelsville)	Dr. Charles A. Dunn.
*Dillonvale	John W. Howell.
Donnelsville	Dr. Horace Heistand.
*Doylestown	F. M. DeWise.
Dresden	Frank Comer, Jr.
Drusilla (Cloverdale P. O.)	
*Dublin	John A. Wing.
*Dunkirk	Dr. C. C. McLaughlin.
*Dupont	Robert Nichols.
East Cleveland	J. H. Stamberger.
East Fairfield	Dr. G. H. Albright.
East Liverpool	Dr. C. B. Ogden.
*East Palestine	Dr. J. M. Van Fossan.
East View (Warrensville P. O.)	
*Eaton	Charles A. Bunting.
Edgerton	Dr. C. Hathaway.
*Edison	Dr. J. H. Jackson.
Edon	Ed. Zwickey.
Eldorado	George W. McCoy.
Elgin	Elmer Coil.
Elida	Dr. H. Q. Alexander.
Elmwood Place	Dr. E. T. Busching.
Elmore	Dr. S. F. Dromgold.
Elyria	Dr. George E. French.
Empire	John Hunter.
Enon	B. C. Hebble.
*Euclid	Dr. H. B. Harper.
Eureka P. O. ((Chambersburg))	
*Fairfield	M. W. Lasure.

* In lieu of a board of health.

Place.	Name.
Fairmount (Hamlet)	H. H. Canfield, Cleveland.
*Fairport (Fairport Harbor P. O.)....	F. T. Johnston.
*Fairview (Rocky River P. O.).....	Frank Jones.
Fairview (Guernsey Co.).....	C. M. Ault.
*Farmersville	C. M. Boomersline.
*Fayette	Benjamin Stoner.
*Fayetteville	Dr. E. W. Love.
*Felicity	J. L. Viers.
*Fernbank.....	Daniel Newbrough.
Findlay	Amos Beardsley.
Fitchville P. O. (Clinton)	S. M. Sly.
Fletcher	Dr. I. C. Kiser.
Florida	William Thompson.
*Flushing	Ralph James.
Forest	John Handchy.
Fort Jennings	Ferd Heising.
Fort Recovery	Dr. C. W. Robison.
Fostoria	W. N. Caldwell.
*Frankfort	John A. Davis.
*Franklin	John B. Miller.
*Frazesburg	Dr. J. D. Fleming.
*Fredericksburg	E. M. Kizer.
Fredericktown	Dr. J. H. Norrick.
*Freeport	Wm. McMath.
Freeport (Prairie Depot P. O.) Wood Co.	
Fremont	Dr. Bertram O. Kreilick.
Fultonham P. O. (Uniontown)	Dr. C. Z. Axline.
Gahanna.....	D. L. Stygler.
Galion	Dr. E. D. Helfrich.
Gallipolis	Chas. B. Robinson.
*Gambier	B. A. Lauderbaugh.
Gann (Brinkhaven P. O.).....	
*Garrettsville	Chas. D. Allen.
Geneva	Dr. F. C. Smith.
*Genoa	Edward Myers.
*Georgetown	Dr. A. W. Mitchell.
*Germantown	William Shaeffer.
*Gettysburg	J. L. Nease.
*Geyer	Thomas H. Irwin.
Gibsonburg	J. P. Tierney.
*Gilboa	Dr. F. B. Black.
Girard	W. D. Cunningham.
Glandorf	Dr. J. A. Harold.
*Glendale	Clifford Allen.
Glenmont	J. C. Bresson, Sec.
Glenville	
Glouster	Dr. H. G. Gibson.
*Gnadenhutten	Zenas M. Drumm.
Gomer	J. A. Edwards, Clerk.

* In lieu of a board of health.

Place.	Name.
Good Hope	D. C. Somers.
*Gordon	Dr. H. Z. Silver.
*Grafton	Henry Trau.
Grand Rapids	Wm. E. Kerr.
Grand River P. O. (Richmond).....	H. S. Barton.
*Grandview Heights	Ross C. Marshall, Sta. A. No. 5, Columbus.
*Granville	Dr. A. K. Follett.
Gratis P. O. (Winchester) Preble Co.,	Fred Boesenberg.
Graysville	W. E. Barker.
*Green Camp	G. W. Collins.
*Greenfield	C. S. Clouser.
Greenspring	John Gallagher.
Greenville	Dr. S. A. Hawes.
*Greenwich	John H. Baker.
*Grove City	Chas. Donaldson.
Groveport	Dr. C. R. Clement.
Grover (Tiltonville P. O.).....	
*Grover Hill	G. W. Morris.
*Hamden	William Young.
*Hamersville	H. H. Hannah.
Hamilton	Dr. Mark Millikin.
Hamler	William Fye.
Hanging Rock	Joseph Kinkaid, Sr.
*Hanover	Dr. W. L. Evans.
Hanoverton	Newton Steller.
Harpster	
*Harrisburg	Albert Deyo.
Harrison	Abe Loos.
Harrisville	W. F. Lemmon.
*Harrod	Chas. R. Boyer.
Hartford (Croton P. O.) Licking Co.,	
Hartford (Trumbull Co.).....	Dr. C. W. Banks.
Hartwell	George F. Laxford.
Harveysburg	Benjamin Weeks.
*Haskins	William H. North.
*Haviland	Dr. Myron A. Hanna.
Hayesville	Dr. T. R. Laughbaum.
*Hebron	W. D. Lietz.
*Helena	Fred J. Richards.
Hemlock	Dr. R. W. Miller.
Hicksville	B. L. Kelsey.
*Higginsport	Dr. Clement D. Smedley.
Highland P. O. (New Lexington) ...	
*Hilliards	Dr. J. W. Reason.
Hillsboro	Dr. J. D. McBride.
Hiram	Dr. F. H. Hurd.
*Hollansburg	Dr. G. J. Martz.
*Holgate	Adam Kemmer.
*Holloway	Dr. G. J. Martz.

* In lieu of a board of health.

Place.	Name.
Holmesville	C. W. McClelland.
*Hopedale	W. H. Beckett.
*Hoytville	Cyrus W. Noble.
*Hubbard	Dr. W. H. Button.
Hudson	Dr. H. C. Coolman.
*Huntsville	Dr. Frank A. Richardson.
*Huron	Robert Day.
*Idlewood (Warrensville P. O.).....	Geo. W. Radcliffe.
Independence	
Ironton	Dr. E. E. Wells.
Ithaca	Dr. Charles J. Woods.
Jackson	John W. Laird.
Jacksonboro (West Middletown P. O.)	John Stamm.
*Jackson Center	A. A. Davis.
*Jacksonville	Henry Wolfe.
Jamestown	Harry C. Lieurance.
*Jefferson	W. S. Andrews.
*Jeffersonville	E. W. Bargdill.
Jenera	C. H. Heldman.
*Jeromeville	Simon L. Davis.
*Jerry City	B. F. Palmerton.
*Jerusalem	I. B. Carleton.
*Jewett	George W. Busby.
Johnsonville	
Johnstown	Dr. E. S. Rutledge.
Junction City	Dr. H. W. Shaw.
*Kalida	Dr. C. F. Douglas.
Kelleys Island	George P. Schardt.
*Kenmore	Dr. Earl Z. Alspach.
*Kennedy Heights (Kennedy P. O.)...	P. W. Reinsagen.
Kent	F. H. Vickers.
Kenton	Joe Bonham.
Killbuck	William C. Stout.
Kimbolton	F. M. Fowler.
Kingston	F. P. Long.
*Kirby.....	Dr. E. E. Burns.
*Kettleville	Dr. O. O. Lemaster.
*Kirkersville	John C. Davy.
*Kossuth	Jesse Conner.
Lafayette	Dr. N. Sager.
La Grange	Dr. J. W. Lindsey.
Lakeside	Dr. O. L. Mapes.
*Lakeview	Elba L. Van Horn.
Lakewood	Dr. A. E. McClure.
Lancaster	Dr. J. P. Hershberger.
*Larue	Dr. Finley Van Orsdall.
Latty	Charles Howel.

Place.	Name.
Laura	Dr. O. H. Stuhlman.
Laurelville	Dr. W. D. Cain.
Lebanon	Dr. A. W. Mardis.
*Leesburg	Dr. K. R. Teachnor.
Leesburg (Leesville P. O.).....	
*Leesville P. O. (Leesburg).....	W. C. Sharp.
Leetonia	Dr. S. R. McCreedy.
*Leipsic	Dr. William L. Werner.
*Le Roy	Henry Rice.
Lewisburg	A. N. Cox.
Lewisville	V. E. Dillon.
*Lexington	Dr. J. P. Stober.
Liberty Center	L. K. Allen.
Lima	Dr. A. L. Jones.
*Limaville	S. E. Beitz.
Lindale	
*Linden Heights	T. M. Dodds.
*Lindsey	Dr. E. V. Berry.
*Lisbon	David H. Eells.
*Lithopolis	E. E. Myers.
Little Sandusky	
*Lockbourne	M. K. Barnes.
Lockington	Dr. J. Robert Caywood, Clk.
*Lockland	Valentine Harting.
*Lodi	A. W. Kinney.
*Logan	Dr. Edward E. Campbell.
*London	Dr. John W. Parker.
Lorain	Dr. Edward V. Hug.
*Loramie	Fred Anthony.
*Lore City	E. F. Milligan.
Londonville.....	Walter S. Young.
Louisville	Dr. F. W. Schilling.
*Loveland	Dr. J. D. Wakefield.
Lowell	A. J. Thompson.
*Lowellville	Porter Watson.
*Lower Salem	Aaron Hartshorn.
*Lucas	Dr. J. M. Hyde.
*Lynchburg	Robert M. Lewis.
*Lyons	Dr. Thomas Blair.
*McArthur	Milton L. Pearce.
McClure	E. E. Britton.
*McComb	James H. Byal.
McConnelsville	Edgar Sharp.
*McGuffey	Fred Wies.
*Macedonia	P. B. Seacov.
*Macksburg	Samuel H. Dyer.
*Madison	Dr. S. D. Good.
Madisonville	Dr. C. L. Metz.
Magnetic Springs	Dr. M. B. Newhouse.

* In lieu of a board of health.

Place.	Name.
*Magnolia	L. H. Scheideger.
*Maineville	James G. Hill.
Malinta	W. M. Hess.
Malta	W. R. Scott.
Malvern	Dr. James C. McClester.
Manchester	Dr. R. W. E. Irwin.
Mansfield	Dr. M. J. Davis.
Mantua	E. H. Knowlton, Clerk.
Marble Cliff	Dr. McKendree Smith.
*Marblehead	A. H. Elwell.
*Marengo	I. E. Eakins.
Marietta	Dr. F. S. McGee.
Marion	Addison Bain.
*Marseilles	Dr. E. S. Jones.
*Marshallville	Floyd A. Shisler.
*Martinsburg	Dr. W. E. Shrontz.
Martins Ferry	Dr. J. W. Darrah.
*Martinsville	Monroe Brown.
*Marysville	Dr. H. G. Southard.
Mason	Dr. M. H. Houseworth.
Massillon	Dr. T. Clarke Miller.
Matamoras (New Matamoras).....	
*Maumee	Philip Hartman.
Mechanicsburg	Dr. H. Dickson.
*Medina	C. O. McDowell.
*Melrose	T. J. Myers.
*Mendon	S. C. Lamenyon.
*Mentor	Dr. J. W. Lowe.
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Miamisburg	Dr. William Shuler.
Middleburg	C. C. Heath.
Middlefield	Dr. F. S. Clapp.
Middle Point	Dr. W. H. Beery.
Middleport	Dr. D. S. Hartinger.
Middletown	Dr. George D. Lummis.
Midland (Midland City P. O.).....	
Midland City P. O. (Midland)	Dr. A. B. Martin.
Midway (Sedalia P. O.).....	
*Mifflin	George Fulmer, R. D. No. 8, Ashland.
*Milan	J. W. Seeley.
*Milford	Dr. C. J. Spence.
*Milford Center	Oscar Miller.
Millbury	Dr. C. M. Diebert.
Milledgeville	Dr. W. T. Mathews.
*Miller City	Dr. Lewis E. Deuble.
Millersburg	Charles A. Estill.
Milton (West Milton P. O.).....	
Milton Center	Dr. J. F. Noble.
*Miltonsburg	Dr. Charles R. Keyser.
Mineral City	Dr. C. H. Sawyer.

* In lieu of a board of health.

Place.	Name.
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*Minerva	Elmer E. Fultz.
*Mingo Junction	David E. Jordan.
*Minster	Louis Budde.
*Mogadore	William Saxe.
*Monroe	James F. Linn.
*Monroeville	Dr. E. R. Kreider.
*Montgomery	W. B. Ferguson.
*Montezuma	R. E. Wills.
Montpelier	Dr. J. V. Lesnet.
*Morrat	Fred McCumber.
*Morristown	Joshua DeWees.
Morrow	Dr. Leonard Mounts.
Moscow	Dr. W. S. Purkhiser.
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Mt. Cory	E. C. Cramer.
Mt. Eaton	Dr. C. N. Clark.
*Mt. Gilead	Dr. George H. Pugh.
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*Mt. Orab	Dr. C. H. Matthews.
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Mt. Vernon	Dr. H. W. Blair.
Mt. Victory	Dr. A. W. Titsworth.
*Mt. Washington	Dr. W. C. Langdon.
*Mowrystown	William A. Martin.
Murray City	Dr. E. H. Hayman.
Mutual	C. M. Goul.
Napoleon	D. H. Hancock.
*Nashville	Charles Campbell.
Navarre	John Bailiss.
Nellie	William T. Heffelfinger.
Nelsonville	Dr. J. M. Hyde.
*Nevada	Dr. H. E. Dwire.
Neville	F. M. Neal.
*New Albany	F. M. Heischmann.
*New Alexandria	Dr. C. E. Gourley.
Newark	Dr. W. H. Knauss.
New Athens	Dr. A. B. Tubbs.
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*New Bremen	Dr. G. A. Havemann.
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New Comerstown	William Tidrick.
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New Knoxville	Dr. H. E. Fledderjohann.
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*New Lebanon (Montgomery Co.).....	Lutie Piatt.
New Lexington (Highland P. O.).....	
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New London	William H. Whitney.
*New Madison	C. H. Coblentz.
*New Matamoras P. O. (Matamoras)...	J. R. Johnston.
*New Paris	Dr. E. E. Bevington.
New Philadelphia	Dr. George H. Peck.
New Richmond	Dr. D. M. Roberts.
*New Riegel	George Lonsway.
*New Salem	Dr. W. R. Carle.
*New Straitsville	Samuel P. McClain.
*Newton Falls	Dr. H. A. Fiester.
*Newtown	Dr. T. B. Mulloy.
*New Vienna	Dr. J. A. Mercer.
*New Washington	George B. Wolfe.
*New Waterford	A. J. Hayes.
*New Weston	Dr. J. T. Patton.
*Ney	Dr. Park M. Lehman.
Niles	Dr. H. V. Ormerod.
North Baltimore	Dr. G. W. Foltz.
*North Bend	William Wiesman.
*North Dover P. C. (Bay).....	George L. Osborn.
North Lewisburg	Chauncey D. Creston.
North Lindale	Hugh Geariety.
*North Robinson	Harry G. Smith.
Norwalk	Louis Fiesinger.
*Norwich	Joseph H. Hammond.
Norwood	Dr. Frank Perry.
*Nottingham	Dr. W. O. Jenks.
Oak Harbor	Dr. E. B. Huyck.
*Oak Hill	William Jenkins.
*Oakley	Dr. Herman H. Schulze.
Oakwood (Montgomery Co.).....	
*Oakwood (Paulding Co.)	A. M. Morgan.
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Octa (Fayette Co.)	
Ohio City	Clarence LeValley.
*Olmsted Falls	L. L. Partch.
*Orangeville	Dr. W. C. Holbrook.
Orrville	Dr. A. A. Brooks.
*Osborn	Charles B. Snyder.
Osgood	H. C. Miller.
*Osnaburg	Joseph Davenport.
*Ostrander	Jasper F. McKittrick.
*Ottawa	Dr. A. F. Sheibley.

* In lieu of a board of health.

Place.	Name.
*Ottoville	Dr. John F. Ockuly.
Otway	Simon Crow.
*Owensville P. O. (Boston).....	Dr. G. G. Rutledge.
*Oxford	Dr. Charles O. Munns.
Painesville	S. A. Haskell.
*Palestine	Milton Keener.
Pancoastburg P. O. (Waterloo).....	
*Pandora	Dr. P. D. Bixel.
Pataskala	Dr. B. B. Ashbrook.
Patriot	
Patterson	Benjamin Trobridge.
Paulding	Dr. John U. Fauster.
*Payne	Levi Reynolds.
*Peebles	Dr. George F. Thomas.
Pemberville	Dr. E. M. Collier.
*Peninsula	M. J. Harrigan.
Perrysburg	Dr. D. R. Canfield.
Perrysville	Dr. L. D. Hyatt.
Phillipsburg	S. A. Mosby, Secretary.
Philo P. O. (Taylorsville)	William C. Mason.
*Pickerington	Frank Bish.
Piketon	S. H. Cutler.
*Pioneer	Arthur F. Norris, V. S.
Piqua	Dr. J. H. Lowe.
Pitsburg P. O. (Arnettsville).....	Dr. J. O. Starr.
*Plain City	J. M. White.
*Plainfield	J. R. Gaumer.
*Pleasant City	J. F. Secrest.
Pleasant Hill	Dr. Judson Teeter.
*Pleasant Ridge	C. H. Bowlby, D. D. S.
*Pleasantville	L. Jay Brooke.
Plymouth	Dr. J. Frank Holtz.
Poland	Dr. C. R. Justice.
Polk	Dr. W. H. Rhinchart.
*Pomeroy	Dr. L. G. Gribble.
*Portage	G. R. Haight.
Port Clinton	Dr. J. G. Yingling.
*Port Jefferson	Dr. D. J. Cargill.
Portsmouth	Dr. S. B. McKerrihan.
Port Washington	Dr. F. B. Larimore.
*Port William	Dr. Paul D. Espey.
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Powhatan Point	S. J. Faulkhauser.
*Prairie Depot P. O. (Freeport).....	H. E. West.
Proctorville	Dr. R. E. Atkinson.
Prospect	G. F. Gast.
Put-in-Bay	Adam Heidle.
Quaker City	Eli Hayes.

* In lieu of a board of health.

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*Racine	Dr. John Philson.
*Rarden	Dr. R. A. Foster.
Ravenna	Henry J. Shreader.
*Rawson	Michael Smith.
*Reading	Nicholas I. Revermann.
*Rendville	William H. Shelton.
*Republic	Samuel J. Beard.
*Reynoldsburg	Worral L. Orem.
Richmond (Grand River P. O.) Lake Co.	H. S. Barton.
Richmond (Jefferson Co.)	Dr. Samuel Rothacker.
Richwood	J. F. Ledley.
*Ridgeway P. O. (West Ridgeway)	Dr. E. E. Lynch.
*Ripley	Dr. A. W. Francis.
*Rising Sun	H. M. Raub.
*Rittman	Dr. G. R. Hagerman.
*Rochester	D. C. Mann.
*Rock Creek	J. E. Gladding.
Rockford	George Kimble.
Rockport (West Park P. O.)	
*Rockyridge	S. R. Curran.
*Rocky River	Jacob Burkemer.
*Rogers	H. E. Byers.
Rome (Stouts P. O.)	
*Roscoe	Samuel T. Dobson.
*Roseville	W. H. Garrett.
*Rossburg P. O. (Rossville)	C. W. Wheeler.
Rossville (Rossburg P. O.)	
Roswell	
Roshsylvania	W. H. Drum.
*Rushville	Dr. W. C. Lewis.
Russellville	M. Breen.
*Sabina	J. H. Burris.
St. Bernard	Dr. A. C. Krumpelbeck.
*St. Clairsville	Dr. S. L. West.
St. Henry	Dr. J. A. Schirack.
*St. Louisville	E. F. Dush.
St. Marys	Dr. J. E. Heap.
*St. Paris	Dr. H. Rush Zeller.
Salem	Dr. E. J. Schwartz.
*Salesville	Joseph R. Dement.
*Salineville	Dr. Charles F. Vasey.
Sandusky	Dr. H. D. Peterson.
*Sarahsville	Jonah Grimes.
*Sardinia	Charles B. Yearsley.
*Savannah	Simon Stahl.
Savler Park	Dr. B. F. Lehman.
Scioto	Dr. G. D. Custer.

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Place.	Name.
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Scott	Dr. F. C. Duckwall.
Sebring	Lee Shively.
Sedalia P. O. (Midway, Madison Co.)	Dr. E. B. Mead.
*Sekitan	Noah Staton.
*Senecaville	Frank Morrison.
*Seven Mile	C. B. Wilson.
*Seville	George O. Morton.
*Shanesville	Dr. R. J. Stremper.
*Shawnee	John Davis.
Shelby	Dr. Roy E. Smucker.
*Sherodsville	Richard Redfern.
Sherwood	Dr. H. C. Lindarsmith.
*Snioh	Dr. Ralph B. Tate.
*Shreve	James H. Andress.
Sidney	William C. Wyman.
*Silverton	Dr. A. A. Sprague.
*Sinking Springs	Dr. J. E. Chapman.
Smithfield	Ross C. Moore.
*Smithville	W. G. Zimmerman.
Somerset	Dr. Michael Clouse.
*Somerville	Frank Chapin.
South Bloomfield	
*South Charleston	George W. Atchison.
South Lebanon P. O. (Deerfield)	Dr. V. T. Reynolds.
South Newburg	
*South Point	Dr. William Wilson Lynd.
*South Salem	H. C. Harper.
South Solon	Dr. Fred L. Wilson.
*South Vienna P. O. (Vienna)	W. G. Harris.
*South Webster	S. S. Ferguson.
*South Zanesville	F. R. Bowers.
Sparta	Dr. T. A. Huggins.
Spencerville	G. A. Rusler.
*Springboro	J. B. Haines.
Springfield	Dr. I. E. Seward.
*Spring Hills	Dr. George E. Kerns.
*Spring Valley	Dr. R. W. Smith.
*Stafford	U. H. Ullmann.
Steubenville	John Welch.
Stewart	G. H. Hawk.
*Stockport	Dr. T. J. Lyne.
Stone Creek	
Stouts P. O. (Rome)	Dr. R. Y. Littleton.
Strasburg	Dr. J. C. Schutzbach.
Struthers	S. D. Strain.
*Stryker	John E. Meek.
Sugar Creek	Homer Finzer.
*Sugar Grove	Adam Mills.
Summerfield	John Baughin.
Summeford	

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Place.	Name.
Sunbury	J. A. Wilson.
Swanton	B. F. Mills.
*Sycamore	Dr. I. B. Gibbs.
*Sylvania	A. D. Lewis.
*Tarlton	Edward S. Ballard.
Taylorville (P. O. Philo).....	
*Terrace Park	Dr. John K. Scudder.
*Thornville	Dr. Harry L. Hite.
Thurman P. O. (Centerville).....	
Tiffin	Dr. W. H. Benner.
*Tiltonville P. O. (Grover).....	Henry H. West.
Tippecanoe City	F. N. Agenbroad.
Tiro	Dr. G. O. Blair.
Toledo	Dr. B. Becker.
*Toronto	Joseph Chaîne.
Trenton	Edward Kopp.
*Trimble	Harvey Wyne.
Trinway	Charles McGee.
*Trotwood	George C. Bunnell.
Troy.....	Dr. J. S. Shinn.
*Tuscarawas	C. F. Veigel.
Uhrichsville	Dr. J. E. Groves.
Union City	Francis Bourguin.
Uniontown (Fultonham P. O.).....	
*Unionville Center	Dr. C. O. McCune.
Unipolis	Dr. J. E. Bayliff.
*Upper Sandusky	Dr. Otto Carl Stutz.
Urbana	Dr. Richard T. Henderson.
*Utica	W. A. Peet.
Van Buren	O. Robbins, Mayor.
*Vandalia	Dr. J. M. Deam.
Vanlue	Dr. James L. Schrote.
Van Wert	Dr. C. G. Church.
Venedocia	John E. Jones.
Vermilion	H. T. Baldwin.
Versailles	Dr. C. F. Ryan.
Vienna (South Vienna P. O.).....	
*Vinton	Dr. J. C. Strausbaugh.
*Wadsworth	Clint Waffle.
Waldo	Dr. Robert S. Dombaugh.
Wapakoneta	George P. Steck.
*Warrensville P. O. (East View).....	Charles C. Murfett.
*Warrensville P. O. (Idlewood).....	George W. Radcliffe.
Warren	Dr. George N. Simpson.
*Warsaw	Dr. E. M. Wright.
Washington C. H.....	Dr. L. P. Howell.
*Washington	Dr. I. M. Thompson.

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*Washingtonville	Peter M. Herold.
Waterloo (Pancoastburg P. O.).....	
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*Wauseon	C. B. Onsted.
*Waverly	James J. Emmitt.
*Waynesburg	William Waggoner.
Waynesfield	Amos Shockey.
Waynesville	Dr. Thomas Sherwood.
Webster	J. F. Byrd.
*Wellington	E. D. Snyder.
Wellston	James R. Ward.
Wellsville	Dr. M. C. Tarr.
*West Alexandria	C. B. Dye.
West Cairo	Dr. Charles E. Stadler.
*West Carrollton	Abraham Simpson.
West Cleveland	
West Elkton	A. W. Y. Conarroe.
Western Star	Fred Becker, R. D. No. 2. Wadsworth.
Westerville	Dr. H. L. Smith.
West Farmington	Albert Ostrom.
West Jefferson	James McCarty.
West Lafayette	W. C. Wiggins.
*West Leipsic	W. C. Miller.
*West Liberty	Dr. A. C. Brindle.
*West Manchester	A. J. Hartzell.
*West Mansfield	Dr. W. T. Sullivan.
West Millgrove	Dr. C. B. Hatfield.
*West Milton P. O. (Milton).....	Dr. Herbert R. Pearson.
Weston	Dr. J. W. Williams.
*West Park P. O.	Dr. Ira B. Gordon.
West Ridgeway (Ridgeway P. O.)....	
West Rushville	William Kerr.
*West Salem	Dr. E. C. Randebaugh.
West Union	Dr. James W. Bunn.
*West Unity	S. I. Rose.
Wharton	William Krider.
*Whitehouse	Harry Hopewood.
Wilkesville	Dr. M. Z. McKibben.
*Williamsburg	Dr. O. B. Martin.
Williamsport	Dr. D. H. Marcy.
Willoughby	James Maloney.
Willow P. O. (Newburg Heights)....	Dr. F. E. Farrar.
*Willshire	Dr. J. F. Shaffner.
Wilmington	Dr. G. W. Wire.
Wilmot	Julius J. Lenz.
*Winchester	Dr. T. H. Trout.
Winchester (Gratis P. O.).....	
Windham	H. J. Higley.
*Woodfield	Louis Hoeffler.
Woodstock	D. P. Smith.
Woodville	Dr. F. G. Blanchard.

* In lieu of a board of health.

Place.	Name.
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*Worthington	T. E. Albert.
Wren	Nelson Moser.
Wyoming	Fred L. Townley.
Xenia	Dr. A. C. Messenger.
Yellow Springs	William Loe.
*Yorkshire	Henry Beeman.
Youngstown	Dr. H. E. Welch.
Zaleski	
*Zanesfield	Dr. O. H. McDonald.
Zanesville	Dr. G. W. McCormick.
*Zoar	Christian Ruof.

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